the OIL AND GAS JOURNAL

The Leader in Well Servicing Units

Franks Servicing Units Now Available on Production Schedule in Packaged Assemblies That Fit Any Truck

To facilitate faster delivery of servicing units to customers, Franks is now building "packaged" units which will fit any standard truck of adequate capacity and which can be installed in 12 to 36 hours. The basic unit is a single or double drum hoist, including adaption frame, power take-off, gear shift, and operator's platform ready for mounting on truck. Optional items are: plain bed with tail roll or bed with mast supports and reeving sheaves; single or double pole mast, or telescoping derrick. The unit is also adaptable for mounting on a suitable trailer. "Packaged" units are available for export shipment and can be easily installed by any competent mechanical crew.

Star Features:

- Lasts Longer
- Minimum Maintenance
- Faster Rigging
- Faster Operation
- Faster Moving
- Lower Costs

Franks "packaged" units are the same as those which have proven less expensive per work done, making them the leader in servicing equipment with contractors and companies the world over.

Franks "packaged" units are now scheduled on a continuous production line. For your particular size and model unit contact your nearest Franks representative (located in Odessa, Kilgore, Houston, Alice, Great Bend, Casper, Seminole, and Compton, California, as well as in Tulsa) and have him enter your order.

FRANKS MFG. CORP.
WELL SERVICING AND DRILLING UNITS

Box 3218
Tulsa, Oklahoma

Export Rep.: A. V. Simmonson
149 Broadway, New York, N. Y.

RUGGED AND READY TO ROLL

Both men and equipment have to be rugged to roll out more than *five million miles a month*. That's how far Halliburton goes in its service to the oil industry. Halliburton's present automotive fleet numbers nearly four thousand vehicles, ranging from sturdy little pick-ups to huge, heavy duty super cementers. In addition, Halliburton has five airplanes, five converted LCT's and several barges in regular service. "We'll get there somehow – safely." Behind the wheel of each Halliburton truck is a skilled and experienced representative ready twenty-four hours a day, seven days a week, to perform the high quality of service that has made Halliburton the leader in its field. You'll find it's a good habit to call Halliburton.

HALLIBURTON OIL WELL CEMENTING CO., Duncan, Okla.

M-58 Bethlehem's powerful new drawworks for medium depths

Here's a rig that was many, many months in the development stage—a rig that meets a wider range of drilling conditions than anything we have ever before offered in its class.

The M-58 is designed for depths ranging from 5000 to 8000 ft with 4½-in. drill pipe. It's powerful. It's flexible. It permits great latitude in the choice of engines, engine combinations, and drives. There's never been a rig of its size that could be moved so easily, so quickly, from one job to the next.

Look over the list of the M-58's star features. Consider what they mean in terms of overall economy. Then, for complete details, write or call the Bethlehem Supply office nearest you.

BETHLEHEM SUPPLY COMPANY
General Offices: 21 E. Second St., Tulsa, Okla.
West Coast Headquarters: Los Angeles, Calif.
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

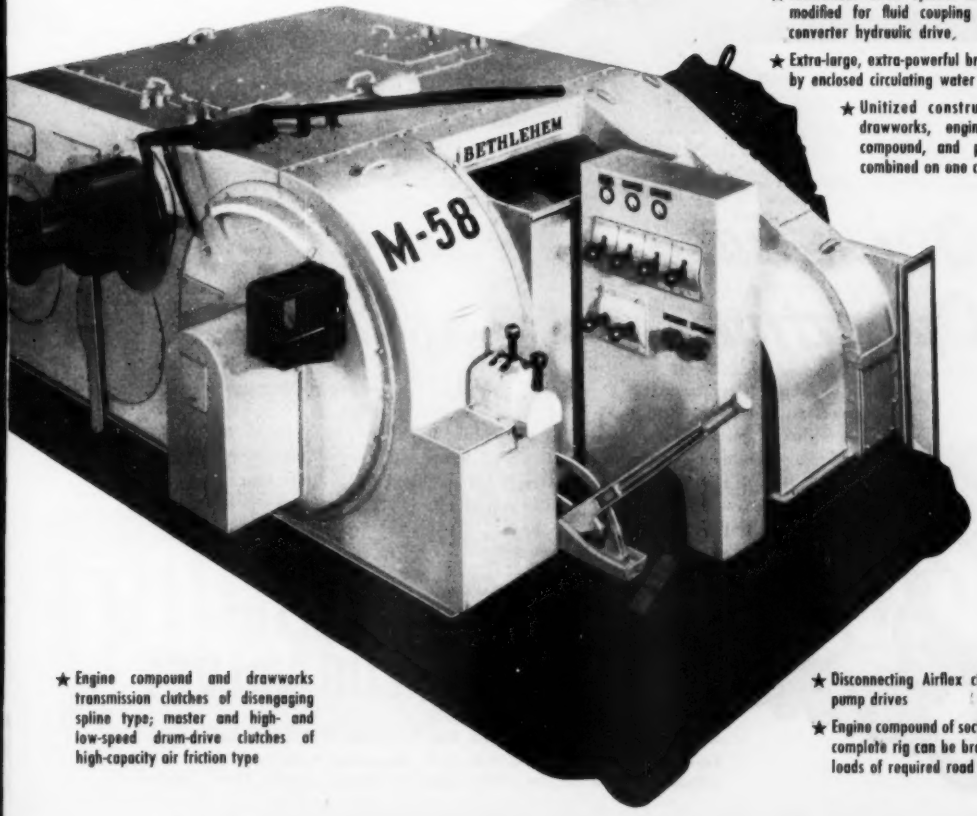
Advanced design... advanced engineering... make possible things like these in the M-58:

★ Two- or three-engine drive with single or double pump drive

★ Mechanical drive system that can be modified for fluid coupling or torque-converter hydraulic drive.

★ Extra-large, extra-powerful brakes cooled by enclosed circulating water system

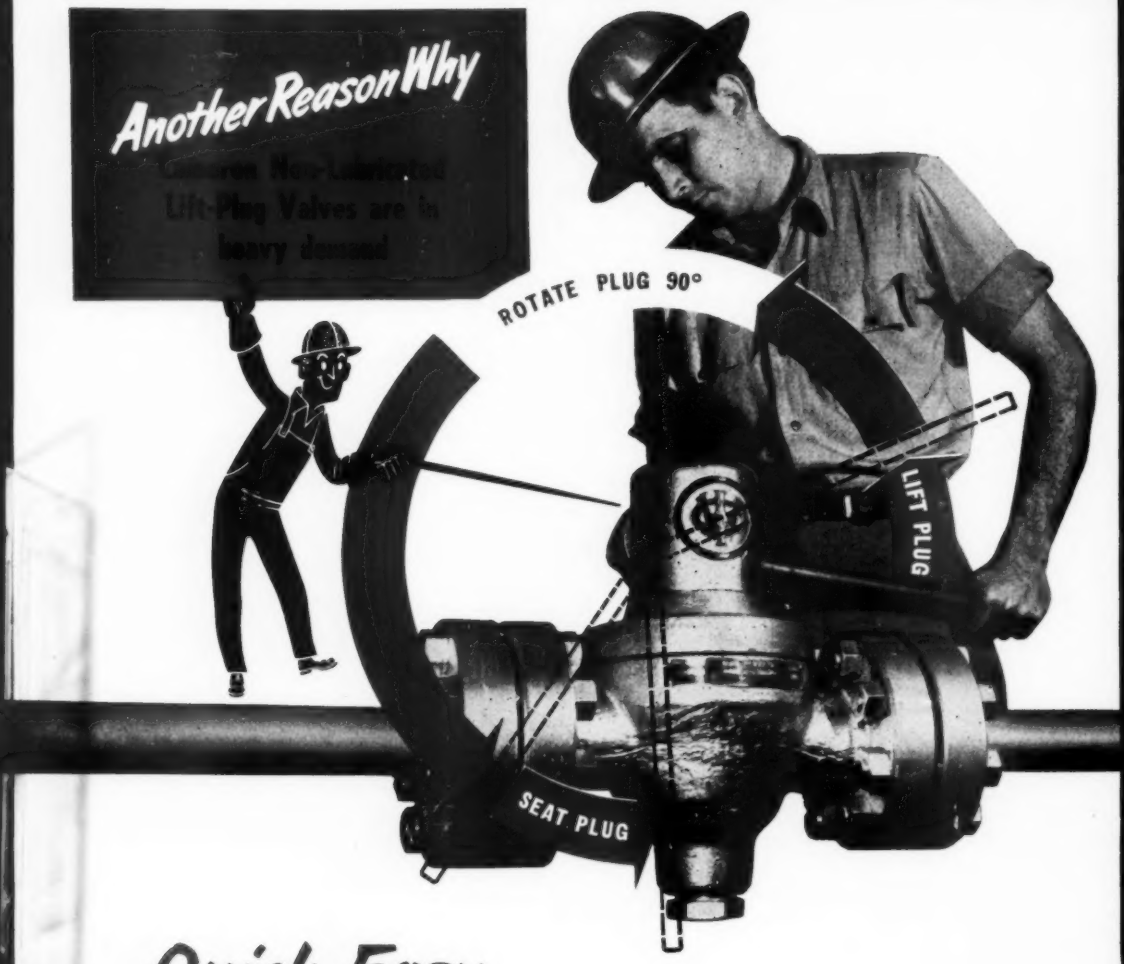
★ Unitized construction with drawworks, engines, engine compound, and pump drive combined on one common skid



★ Engine compound and drawworks transmission clutches of disengaging spline type; master and high- and low-speed drum-drive clutches of high-capacity air friction type

★ Disconnecting Airflex clutch-controlled pump drives

★ Engine compound of sectionalized type; complete rig can be broken down into loads of required road width



Quick, Easy Operation... with no lubrication

The Cameron Non-Lubricated Lift Plug Valve employs a novel mechanical design which requires less operating effort than other valves. In three-quarters of a turn of the operating lever, the plug is lifted free of the seat without rotation, then rotated 90° to open or closed position, and finally seated without further rotation. The frictional forces are thus overcome and the valve operates with extreme ease. Breaking the metal-to-metal contact between the seat and plug also prevents scoring of the seat and obviates the need for lubrication.

Cameron

NON-LUBRICATED LIFT-PLUG VALVES

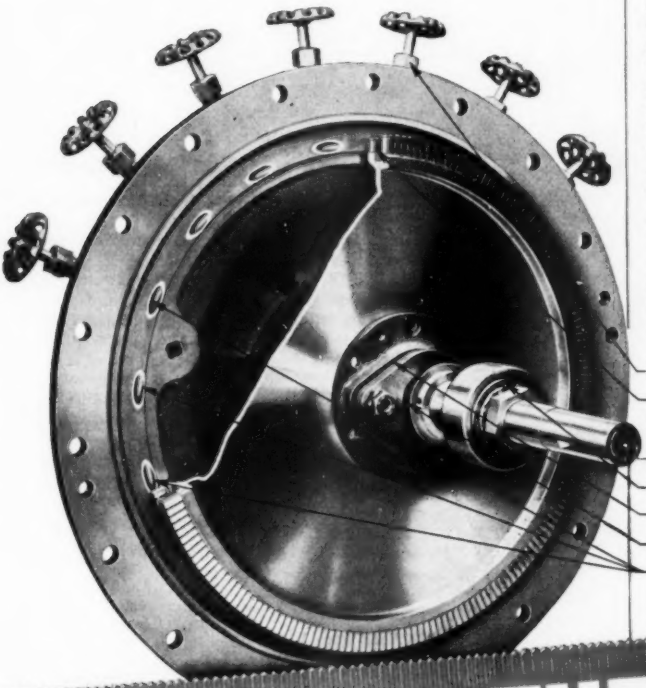
CAMERON IRON WORKS, Inc. P. O. Box 1212 Houston, Texas

Export: 74 Trinity Place, New York, N. Y. Represented in sterling area by: British Oilfield Equipment Co., Ltd., Duke's Court, St. James's, London S.W. 1, England.

No other steam turbine offers you

SUCH VERSATILE STEAM NOZZLE CONTROL

The larger number of hand valves you see on a Coppus Steam Turbine promises you greater operating economy. At least 60% of the steam nozzles can be individually controlled to give maximum steam pressure in steam chest . . . a guarantee of best water rates at any load. Maintenance economy, too, is assured by the hard chromium plating of the shaft at the stuffing box. It provides the best possible smooth, non-corrosive surface for packing rings.



7 hand valves for efficient partial load operation, (20" turbine shown)

2 row velocity-stage turbine wheel with stainless steel turbine buckets — statically and dynamically balanced

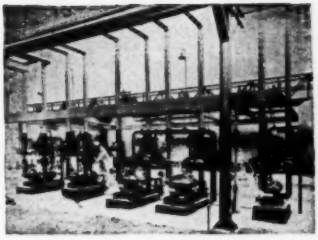
30-40 carbon steel shaft

Oversized double row deep grooved ball bearing

Stuffing box with metallic packing ring

Heavy chrome plating of shaft through stuffing box

3 nozzles always open



Coppus Steam Turbines, Type TF, driving chemical transfer pumps at Celanese Corporation of America's Chemcel Plant

Coppus Steam Turbines ranging from 150 hp down to fractional in 6 frame sizes

MAKE TURBINE DOLLARS GO FARTHER

Why waste money buying turbines with higher horsepower ratings than you need? The higher the horsepower rating, the higher the price. Save money by selecting the Coppus Turbine size closest to your requirements from 150 hp down to fractional. And when you do, you save operating and maintenance costs, too. That's what these other Coppus features are designed to do: exclusive pilot operated excess speed safety trip supplementing constant speed governor; choice of metallic or carbon ring packing assemblies. Designs available for back pressures up to 75 pounds; replaceable cartridge type bearing housings. For full details . . .

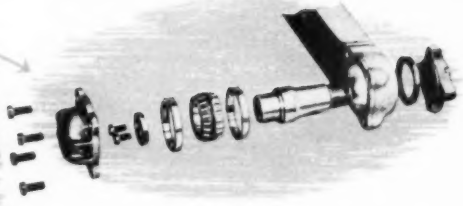
WRITE FOR BULLETIN 135

COPPUS ENGINEERING CORP.,
262 Park Avenue, Worcester 2, Mass.
Sales offices in THOMAS' REGISTER.

COPPUS "BLUE RIBBON" TURBINES

2 more reasons... why "Oilwell" Pumping Units

give you LONGER SERVICE LIFE

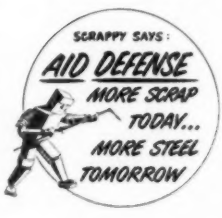


Wrist Pins with Solid Housings and Self-Aligning Bearings

Pumping Unit wrist pins have three critical operation factors. They must (1) rotate freely, (2) carry overhung loads and (3) withstand frequent stress reversals. On "Oilwell" units, heavy-duty wrist pins of alloy steel are mounted in double-row, self-aligning roller bearings. This fully enclosed assembly nests in a spherical one-piece steel housing at the end of the pitman and is grease lubricated through a weatherproof housing-cover equipped with pressure relief fittings. The pin for the crank connection extends through a grease seal and is held securely in the crank by a taper fit and drive-lug nut with locking arrangement. ***With this construction, the pin rotates freely in the pitman under all conditions, there are no bolts in tension and pitman twisting problems are avoided.***

Three Keyways on Gear Shaft Extensions

Scientific counter-balancing reduces the severity of peak-loads, but mechanical limitations make it impossible to eliminate them completely in the gear train. Loads are evenly distributed by mechanical means over the circumferences of pinion and intermediate gears. But since the main gear must be keyed to the cranks, loads recur on identical segments with each crank revolution; reaching their peaks of intensity each time the crank is in horizontal positions. On "Oilwell" Pumping Units, three keyways—120 degrees apart—are provided on the shaft extension of main gears in sizes D-7 and larger. By progressively using these keyways to change the relative position of the cranks, peak loads are made to occur over the six corresponding segments of the gear face. ***This, in effect, extends the useful life of the main gear threefold.***



ASK . . . your "Oilwell" Representative—about the other features in "Oilwell" Pumping Units which save you money—now and later.

OIL WELL SUPPLY DIVISION
UNITED STATES STEEL COMPANY

Executive Office—DALLAS, TEXAS
Export Area Office—
30 ROCKEFELLER PLAZA
NEW YORK 20, N. Y.

Area Offices—CALGARY, CANADA
CASPER, WYOMING . . . COLUMBUS, O.
DALLAS, TEXAS . . . HOUSTON, TEXAS
TULSA, OKLA. . . . LOS ANGELES, CALIF.

USS TRADE MARK

"OILWELL" TRADE MARK

UNITED STATES STEEL

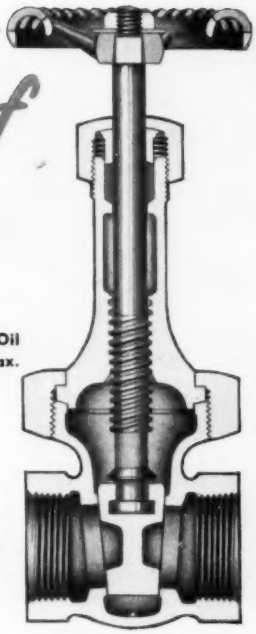
Now-A Complete Line of Crane L-P Gas Valves

SIZES: ¼ to 2 in. incl.

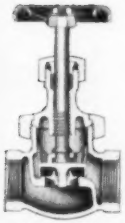
WORKING PRESSURES: UL approved for L-P Gas up to 250 Pounds, Max. Also for Oil or Gas—400 Pounds, 150 Deg. F. Max.; and Water—400 Pounds, 200 Deg. F. Max.

Now, on L-P Gas piping services, you can standardize throughout on dependable, durable Crane L-P Gas valves. By rounding out this line with a companion gate valve, Crane gives you a complete line of valves for the service.

Like the Crane globe, angle, and check valves shown here, the new Crane gates are Underwriters' Approved for L-P Gas service. They are recommended for use in branch and by-pass lines, and for other installations where metal-to-metal seating is approved.

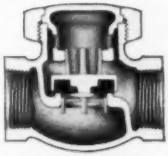


GATE—No. 422
Cross-Section



GLOBE—No. 130
Cross-Section

ANGLE—
No. 131



CHECK—No. 132
Cross-Section

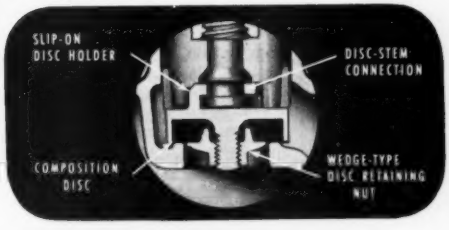
MATERIALS—CONSTRUCTION—TESTING

Body and bonnet of Crane L-P Gas gates are ruggedly constructed of high grade Crane Special Brass to withstand toughest working conditions. The disc, of solid wedge design, is Crane Nickel Alloy, hard, tough, and highly resistant to wear. A deep stuffing box with approved type packing, provides long-lasting, tight sealing of the rising stem. Union ring bonnet joint allows repeated dismantling of the valve without affecting joint tightness.

All Crane L-P Gas Valves are air tested for seat tightness.

CRANE QUICK-CHANGE DISC FEATURE

In globe, angle, and check valves which have composition disc, the disc can be quickly replaced without removing valve from line. Merely take off bonnet assembly, remove disc holder, and replace with spare disc holder containing new disc.



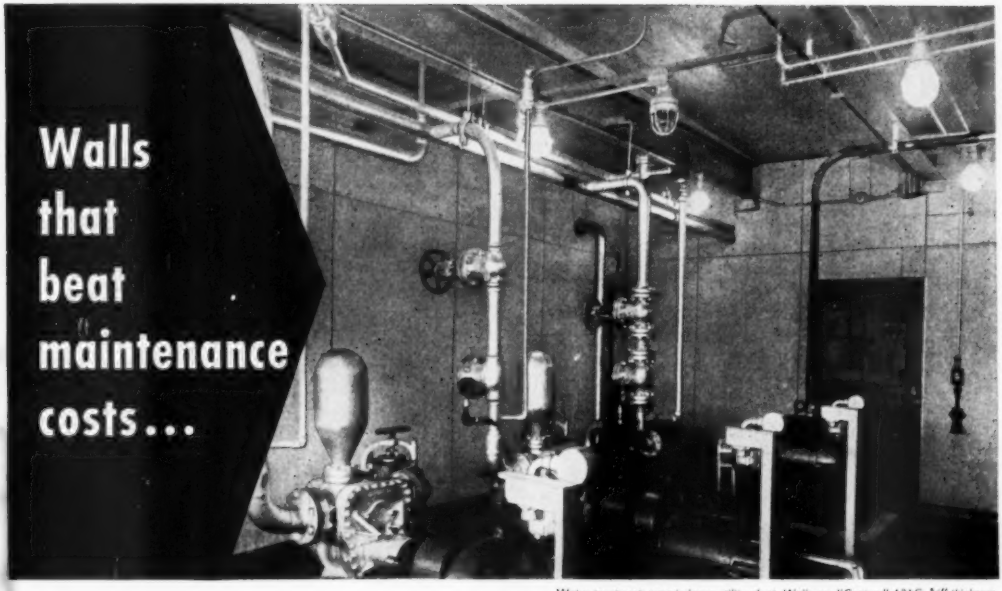
ASK FOR CIRCULAR AD-1899—This free circular gives complete information on Crane L-P Gas Valves—gates, globes, angles, and checks. Includes service recommendations, sizes, prices and dimensions. Ask your Crane Representative for a copy, or write to address below. No obligation.

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

The Oil and Gas Journal, published Mondays by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $4 yearly. Copyright 1952.



Water treatment room in large utility plant. Walls are "Century" APAC, ⅝" thickness.

they're "Century"® APAC!

In the water treatment room above you see how to build walls that won't need maintenance: Use "Century" APAC—Keasbey & Mattison's versatile asbestos-cement structural sheet. APAC can fill nearly all your surface covering needs . . . interior walls and ceilings . . . exterior walls . . . on new structures and modernizations.

CONSIDER THE ADVANTAGES OF APAC:

APAC won't burn! Made of asbestos fibers and Portland cement—both inorganic—APAC will not support combustion . . . makes an excellent fire-retardant barrier!

APAC is maintenance free! It cannot rot, rust, or corrode—rodents and termites can't hurt it. APAC doesn't even need protective painting to preserve it!

APAC is easy to handle—easy to apply! Can be cut and fitted on the job—no milling or planing to bother with. Large-size sheets (standard 4′ x 8′) facilitate rapid coverage. Can be fastened with ring fettered nails or screws. Application labor costs are kept to a minimum!

You'll find "Century" APAC used today in hundreds of plants, in dozens of industries: For siding, office paneling, fire-resistant sheathing in shops and stockrooms, storage bins, linings for elevator casings, shower stalls—in fact, wherever quick, economical construction and maintenance-free service are wanted. Write us for complete information on "Century" APAC and the name of your nearest distributor.

KEASBEY & MATTISON

COMPANY • AMBLER • PENNSYLVANIA

Nature made Asbestos . . . Keasbey & Mattison has made it serve mankind since 1873

K&M best in asbestos

IMPROVED BY A MILLION SUCCESSFUL CEMENTING JOBS!

HALLIBURTON'S FLOATING AND GUIDING EQUIPMENT

You can expect *extraordinary* good service from Halliburton's Floating Equipment. For Halliburton *alone* offers equipment engineered by the enormous experience of more than a million successful cementing jobs! This continuous program of practical improvement, by men who know cementing *best*, maintains Halliburton's leadership and assures you the *highest* degree of efficiency, economy, and safety—no matter how deep the well, how high the temperatures or pressures.

Here are some of the finer features you get in Halliburton's equipment:

★ **MAXIMUM PUMPABILITY!**

Halliburton provides the maximum fluid passage areas through the valve seats to meet the pumping requirements of any job. Super-strong valve seats won't cut out . . . spring operated ball insures positive shut-off.

★ **STRONGER MATERIALS!**

Halliburton's own formula concrete, developed for shock resistance and high strength characteristics, is used in all Guiding and Floating Equipment and is easily and quickly drilled out. New red plastic Guide Shoes and Float Shoes provide similar advantages and offer positive visibility in the drilling fluid.

★ **SAFETY!**

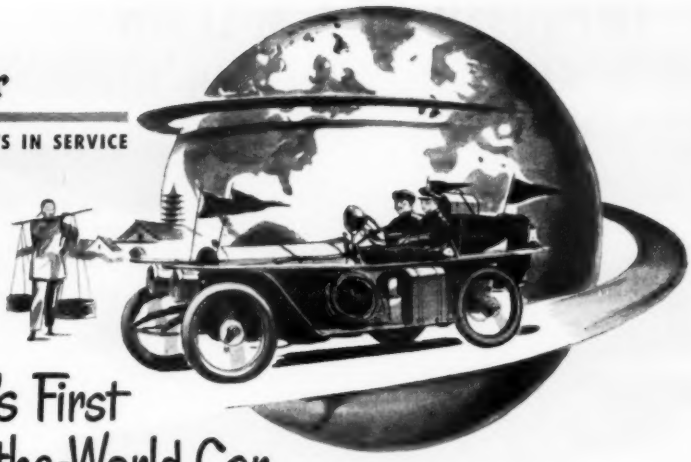
Halliburton's Float Collars and Float Shoes of all types – with either aluminum or Howcolite Seats – can be safely used on any weight of commercially available casing, *to the full collapsible pressure of the casing!* Simply match weight range of pipe to weight range of Halliburton's equipment.

Get this equipment that's engineered and improved by million-well experience . . . Always specify Halliburton's Floating and Guiding Equipment. It's stocked in all standard sizes and types for regular API threaded casings. Phone your nearby Halliburton representative. Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HALLIBURTON YEARS AHEAD IN FLOATING EQUIPMENT!

Spicer

SPECIALISTS IN SERVICE



The World's First Round-the-World Car

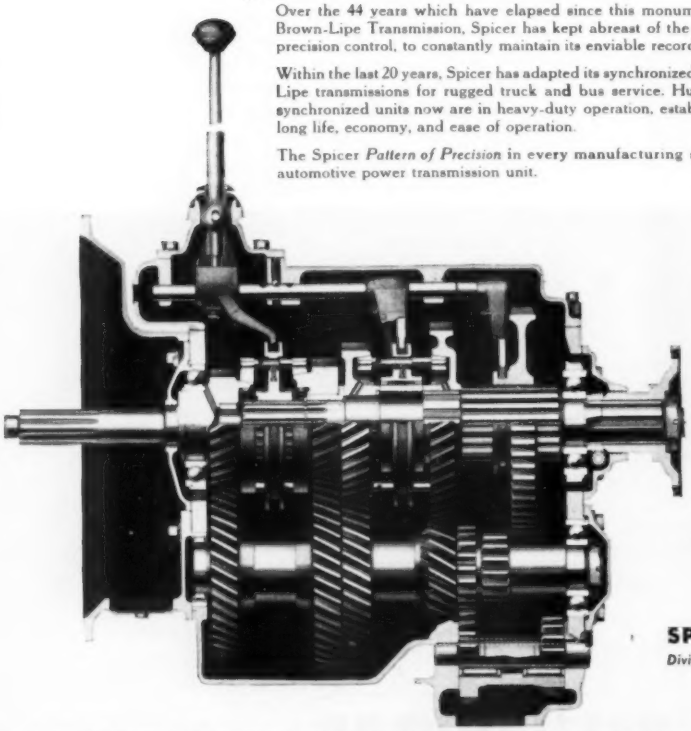
Equipped with a Brown-Lipe Transmission built in the Spicer *Pattern of Precision!*

The first selective type automobile transmission was shipped from the Brown-Lipe factory to the E. R. Thomas Motor Company in 1906. As standard equipment in the Thomas Flyers in 1908, a Brown-Lipe Transmission helped drive one of these famous cars on the first automobile trip ever made around the world.

Over the 44 years which have elapsed since this monumental and gruelling test of the Brown-Lipe Transmission, Spicer has kept abreast of the year-by-year advancements in precision control, to constantly maintain its enviable record of quality production.

Within the last 20 years, Spicer has adapted its synchronized gear-shift principles to Brown-Lipe transmissions for rugged truck and bus service. Hundreds of thousands of these synchronized units now are in heavy-duty operation, establishing outstanding records of long life, economy, and ease of operation.

The Spicer *Pattern of Precision* in every manufacturing step pays off in every Spicer automotive power transmission unit.



The Spicer Brown-Lipe FULLY-SYNCHRONIZED TRANSMISSION for Heavy-Duty Truck and Bus Service

48 YEARS OF Spicer SERVICE

SPICER MANUFACTURING

Division of Dana Corporation • **TOLEDO 1, OHIO**

TRANSMISSIONS • UNIVERSAL JOINTS • BROWN-LIPE AND AUBURN CLUTCHES • FORGINGS • PASSENGER CAR AXLES • STAMPINGS • SPICER "BROWN-LIPE" GEAR BOXES • PARISH FRAMES • TORQUE CONVERTERS • POWER TAKE-OFFS • POWER TAKE-OFF JOINTS • RAIL CAR DRIVES • RAILWAY GENERATOR DRIVES

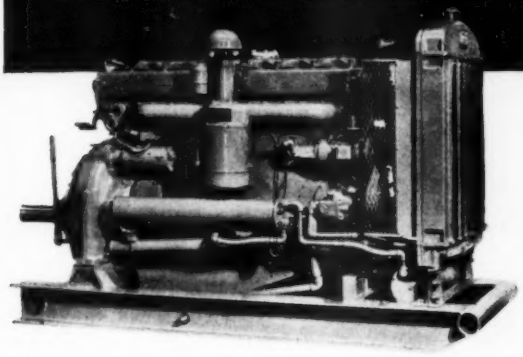
MURPHY DIESEL...

gives you easier starting . . .

more economy . . . smoother

operation . . . better response

***because it has* UNIT FUEL INJECTION**



Another Murphy powered rig about ready to get under way. This one is owned by Carl U. Parry, Drilling Contractor, Freeport, Texas.

MURPHY DIESEL

215

The performance of a diesel engine can be no better than the accuracy of control of fuel injection. That's why we say the unit injector is the heart of the Murphy Diesel. This simple, self-contained unit is both pump and nozzle. There are no high pressure fuel lines to interfere with smooth, accurate, precisely controlled fuel injection and rob you of power and fuel. In the Murphy Diesel, solid fuel completely atomized as a fine fog is injected directly into all parts of a plain, open combustion chamber. Ignition is accomplished solely by the heat of compression of the air within the cylinder. The precisely controlled rate of injection determines the speed and pressure of combustion, hence the power delivered and the amount of fuel used.

Translated into benefits for the user, Murphy Unit Fuel Injection makes possible greater power output with less fuel—better all around performance. Full details are given in the booklet *"10 Questions to Ask a Diesel Engine Salesman"*. Ask your Murphy Diesel Dealer for a copy or write direct.

MURPHY DIESEL COMPANY

5305 W. Burnham St., Milwaukee 14, Wisconsin

TULSA OFFICE—Sales, Parts, Service:
113-117 South Elwood Street, Tulsa, Oklahoma

Sales, Parts and Service: Los Angeles, California; Mt. Vernon, Illinois; Evansville, Indiana; Great Bend, Kansas; Jackson, Michigan; Tulsa, Oklahoma; Amarillo, Dallas, Houston, Lubbock and San Antonio, Texas; Edmonton, Alberta, Canada.

Heavy duty power

for the oilfields

Murphy Diesel Engines and Power Units for drilling and pipe line pumping, 90 to 226 H.P., 1200 and 1400 RPM. Generator Sets, 60 to 140 K.W. Dual-Fuel Engines, 135 to 180 H.P. Also Crude Oil Burning Engines.

Tanks of the General American Transportation Corporation's Storage Terminal, Carteret, N. J., after being painted with Light Gray TANKHIDE.

IF IT'S TOUGHNESS AND LONG LIFE YOU WANT— USE PITTSBURGH TANKHIDE

WHEN you're looking for toughness and durability in a finish for gasoline and oil storage tanks, Pittsburgh TANKHIDE gives you what you want.

● **The combination** of special pigments and weather-resistant vehicles makes TANKHIDE an unusually durable, long-lasting metal protective paint. The ability of TANKHIDE to reflect heat prevents excessive losses caused by evaporation. Not only are evaporation losses prevented but TANKHIDE'S original appearance is maintained for a long time by its unique self-cleaning action.

● **TANKHIDE** is designed to hide thoroughly with one coat, whether sprayed or brushed on.

● **For many years TANKHIDE** primers and finishing coats have been used most satisfactorily in all sections of the country to protect millions of tons of iron and steel in structures, equipment and machinery.

● **Besides TANKHIDE,** Pittsburgh also offers a complete line of protective coatings for every need in the petroleum industry—production and refinery finishes for towers, pipe lines, buildings and equipment; service and bulk station paints; pump enamels and drum finishes.

● **Call on us** for expert advisory service. Our wide experience in supplying finishes to the petroleum industry can be helpful and often save you time and money.

• • •

PITTSBURGH PLATE GLASS COMPANY

Industrial Paint Division, Pittsburgh, Pa.
Factories: Milwaukee, Wis.; Newark, N. J.; Springdale, Pa.; Houston, Texas; Los Angeles, Calif.; Portland, Ore. Ditzler Color Division, Detroit, Mich. The Thresher Paint & Varnish Co., Dayton, Ohio. Forbes Finishes Division, Cleveland, Ohio. M. B. Suydam Division, Pittsburgh, Pa.

PITTSBURGH PAINTS

PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS

PITTSBURGH PLATE GLASS COMPANY

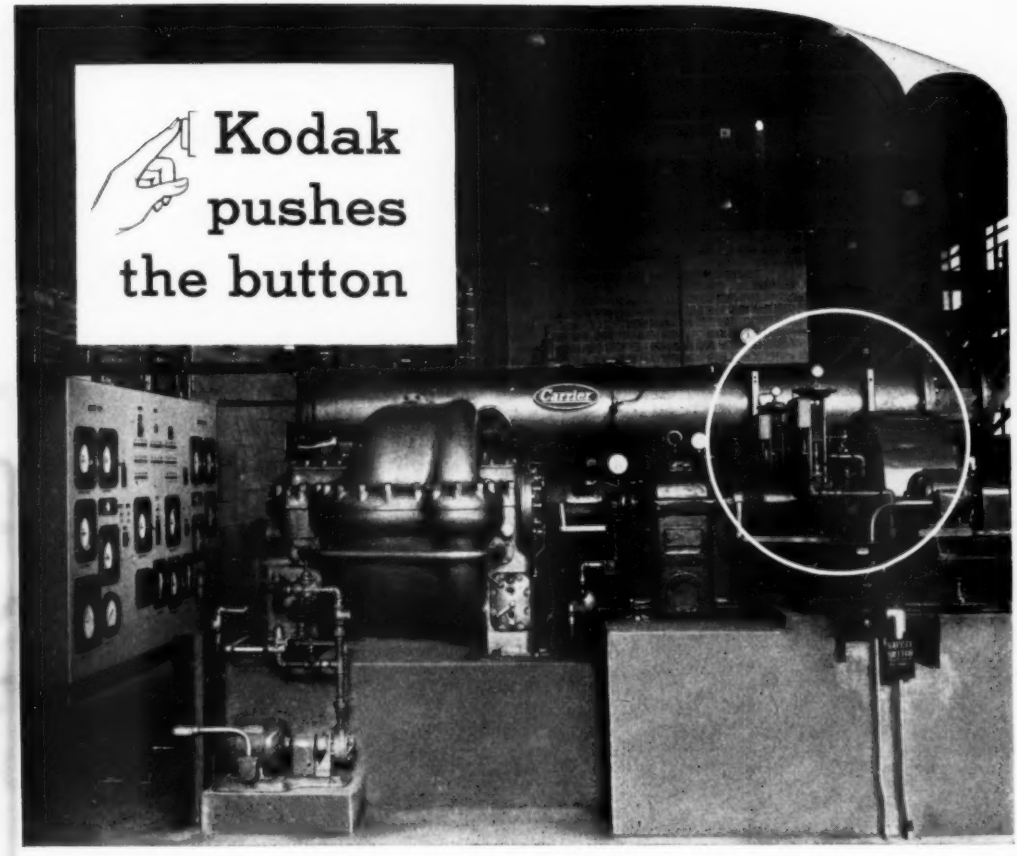
Be sure with Pure

Producers • Refiners • Marketers

of petroleum products

THE PURE OIL COMPANY

Marketing Offices in Principal Cities of the Eastern, Central and Southern States
General Offices, Chicago, Illinois



We do the rest...

in controlling the refrigeration system at Kodak's huge new Distribution Center at Rochester, N.Y.

This center handles practically every Rochester-manufactured Kodak product for storage, packing and shipping. Efficient air-conditioning is extremely important in the storage of sensitive photographic films and papers.

The refrigeration unit, shown above, consists of two 250-ton Carrier centrifugal compressors driven by a constant speed electric motor. These compressors supply the chilled brine to the Taylor controlled zones.

Taylor controls keep the output temperature of the chilled brine constant by regulating the compressor speed through the oil volume in the hydraulic coupling (circled) between the compressor itself and a constant speed motor. During periods of minimum load, an ingenious hot gas by-pass induces a load on the compressors to eliminate surging and keep the system fully automatic. From Friday night to Monday morning, when the load is especially light, the system automatically keeps the brine temperature constant with *no manual attention* whatever. "The most fully automatic compressors we have ever installed" say Carrier engineers about these Taylor controlled centrifugals.

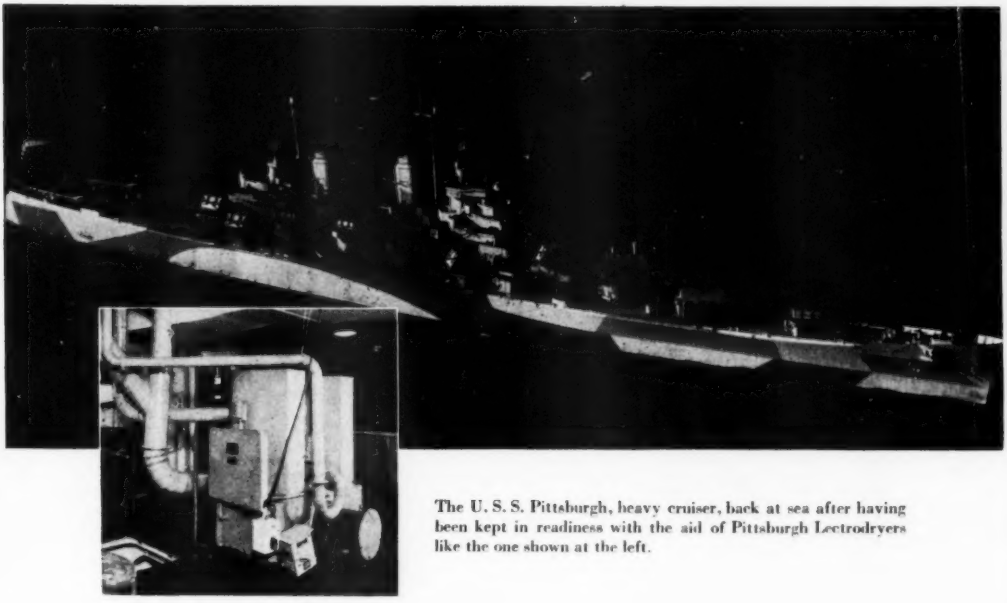
Whether your compressor is reciprocating or centrifugal—driven by an electric motor, steam engine, steam turbine, or gas, Taylor offers automatic compressor control. Ask your Taylor Field Engineer, or write for **Catalog 300.** Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

Suppose YOU

had to "warehouse" a 13,000-ton cruiser . . .



The U. S. S. Pittsburgh, heavy cruiser, back at sea after having been kept in readiness with the aid of Pittsburgh Lectrodryers like the one shown at the left.

The Navy did it by making the ship its own warehouse. In "Operation Mothball" the hull was sealed tight against outside moisture and the relative humidity maintained below 30% with the aid of Lectrodryers*. Now "Operation Zipper" has put the Pittsburgh back in service, its vitals rust-free and corrosion-free.

To warehouse safely any goods that WETth (unwanted moisture) would spoil—depend upon Lectrodryer. A Lectrodryer will DRY your storage-space air continuously, economically, automatically. Lectrodryer* engineers will work with you to design your entire DRYing operation—including selection and installation of moisture-vapor barriers to control atmospheric WETth. Pittsburgh Lectrodryer Corporation, 325 32nd Street, Pittsburgh 30, Pennsylvania.

In England: Birlec, Limited, Tyburn Road, Erdington, Birmingham.
In Australia: Birlec, Limited, 51 Parramatta Road, Glebe, Sydney.
In France: Stein et Roubaix, 24 Rue Erlanger, Paris XVI.
In Belgium: S. A. Belge Stein et Roubaix, 320 Rue du Moulin, Bressoux-Liege.

LECTRODRYERS DRY WITH ACTIVATED ALUMINAS

LECTRODRYER

* REGISTERED TRADEMARK U. S. PAT. OFF.

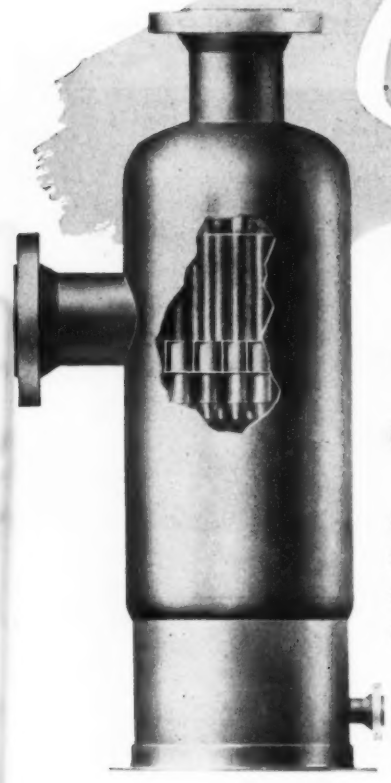
Clean

DRY GAS

in secondary distribution systems

with AEROTEC

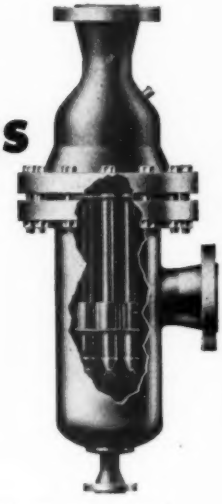
GAS SCRUBBERS



Multiple cyclone tubes of small diameter, assembled in the pressure shell, separate impurities from the gas with high efficiency.

LARGE VERTICAL TYPE

SMALL VERTICAL TYPE



Gas in your distribution lines stays clean and free-flowing with Aerotec Dry Gas Scrubbers on the job. These units apply the principle of centrifuging to remove entrained dusts, liquids, and distillates from the gas. It is a *dry* cleaning process. There is no oil or other filtering medium to carry over into the gas stream. Aerotec also eliminates other difficulties normally experienced with conventional types of scrubbers.

Simple in design and lightweight, Aerotec Dry Gas Scrubbers are available in sizes and capacities to meet all requirements of local distribution systems. Leading utilities such as Consolidated Edison Co., Manufacturers Light & Heat Co., Rochester Light & Heat Co., and many others use Aerotec units in scores of locations with outstanding results.

A Thermix Project Engineer is near you and will be glad to supply technical data and assistance in choosing Aerotec Dry Gas Scrubbers to fit your specific needs. Call or write.

Project Engineers **THE THERMIX CORPORATION** Greenwich, Conn.
(Offices in 38 Principal Cities)
Canadian Affiliates T. C. CHOWN, LTD., Montreal 25, Quebec; Toronto 3, Ontario

Manufacturers
THE AEROTEC CORPORATION
GREENWICH, CONN.

No. 1 in a series of advertisements on the BIW Non-Lubricated Gate Valve.

CONTINUOUS EASE OF OPERATION

Proved by more than 30,000 Valves in Christmas Tree Service

BIW

NON-LUBRICATED GATE VALVE

Oil — Water — Gas to 5000 pounds W P

BEAUMONT IRON WORKS CO.
BEAUMONT, TEXAS
A Subsidiary of American Locomotive Company
Atlas Engineering Works, exclusive sales agents

RECOMMENDED LINE-UP

for smoother, surer valve performance!

Here's why...

Only in Darling cast steel pipe line gate valves do you have the advantage of Darling's fully revolving double disc parallel seat principle . . . and what a difference!

For example, field experience proves time and again that this feature successfully compensates for valve body distortion. There's tight, *easy* closure—regardless!

And on top of that, disc and seat wear is kept *uniform.* So these key parts just naturally last longer!

Think what these advantages mean in smoother, surer performance . . . in *lower cost* operation and maintenance! But get *all* the facts! Helpful, fully descriptive bulletins are yours for the asking.

FOR PLUS VALUES, JOB-PROVED AGAIN AND AGAIN

SEND FOR DATA

Darling Parallel Seat Gate Valves come in a wide range of sizes and types for all gas and oil line requirements. Simply outline your particular service needs or ask for a complete descriptive bulletin.

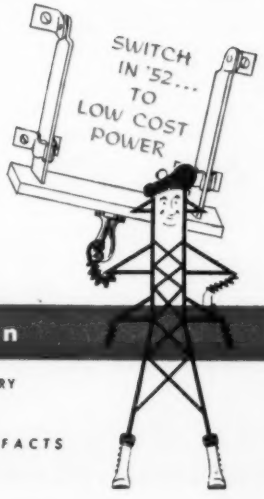
DARLING VALVE & MANUFACTURING CO.

Williamsport 1, Pa.

Manufactured in Canada by Sandilands Valve Manufacturing Co., Ltd., Galt 19, Ont.

. . . to cut costs the Petroleum Industry has switched to *Electric Power*

Pipe line operators discovered many years ago that Electric Power was the answer to lower power cost. Regardless of the job to be done in moving fluid, Electric Power usually can do it more satisfactorily — *and for less.* Above is shown an application by a major oil company near Antioch, Oklahoma, utilizing 1-200 H.P. and 1-75 H.P. and several smaller pump motors for pumping crude oil. Electric Power is also used for tank gauging. Your power problems can be simplified, too, by using Electric Power. Let us PROVE IT TO YOU — now.



Petroleum Electric Power Association

ORGANIZED IN THE INTEREST OF GREATER SERVICE TO THE PETROLEUM INDUSTRY

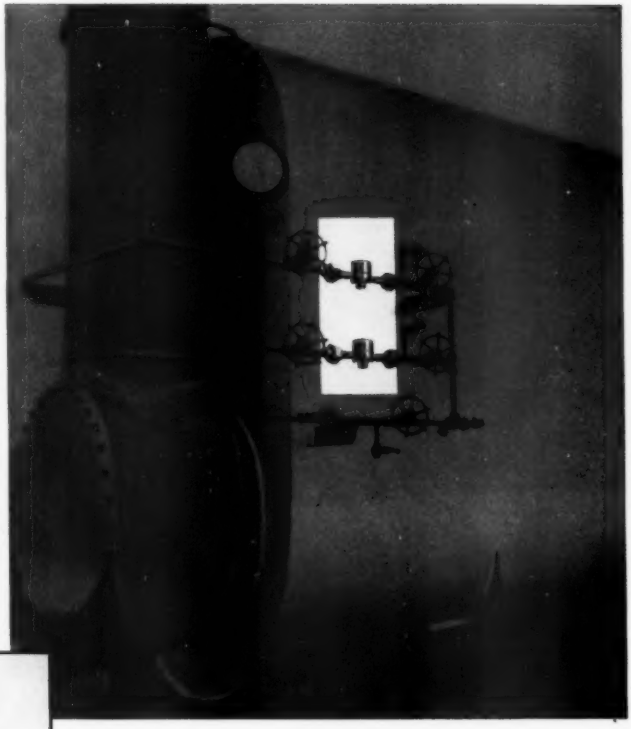
CALL YOUR NEAREST ELECTRIC SERVICE COMPANY FOR MORE FACTS
OR ADDRESS YOUR REQUEST TO P. O. BOX 2771, DALLAS, TEXAS

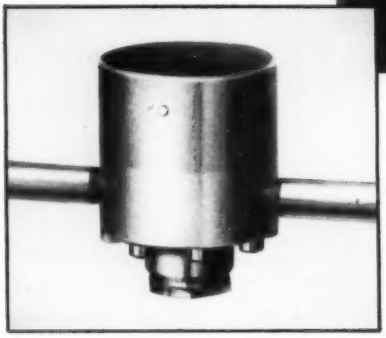
MIGHTY SMALL..

but with a TREMENDOUS CAPACITY

GROVE MITY-MITE

PRESSURE REDUCING REGULATORS





- ENTIRELY SELF-CONTAINED
- SINGLE-SEATED VALVE CONSTRUCTION
- INSTANTANEOUS AUTOMATIC CONTROL
- MAINTAINS CONSTANT DELIVERED PRESSURES
- COMPLETE RANGEABILITY
- EXTREMELY SENSITIVE TO PRESSURE CHANGES

For Initial Pressures up to 3500 pounds; Adjustable Control Range from 5 to 1500 pounds.

Utilizing the proved Grove Powreactor Dome principle, MITY-MITE Reducing Regulators provide a capacity range equal to other regulators ten times their diminutive size. Typical of the Mity-Mite's performance is delivery of more than 15,000 c.f.h. while reducing the pressure from 1000 p.s.i. to 100 p.s.i. Construction is rugged yet compact, measuring but 2¾" x 3¼" and weighing less than 2 pounds. Control is smooth, non-chattering, instantaneous. Shut-off is positive and bubble-tight on dead-end service. Handles temperatures up to 150° F.

Special models can be supplied for pressures up to 5000 p.s.i., for liquid service, and for back pressure regulation. Built-in relief valves incorporated if required.

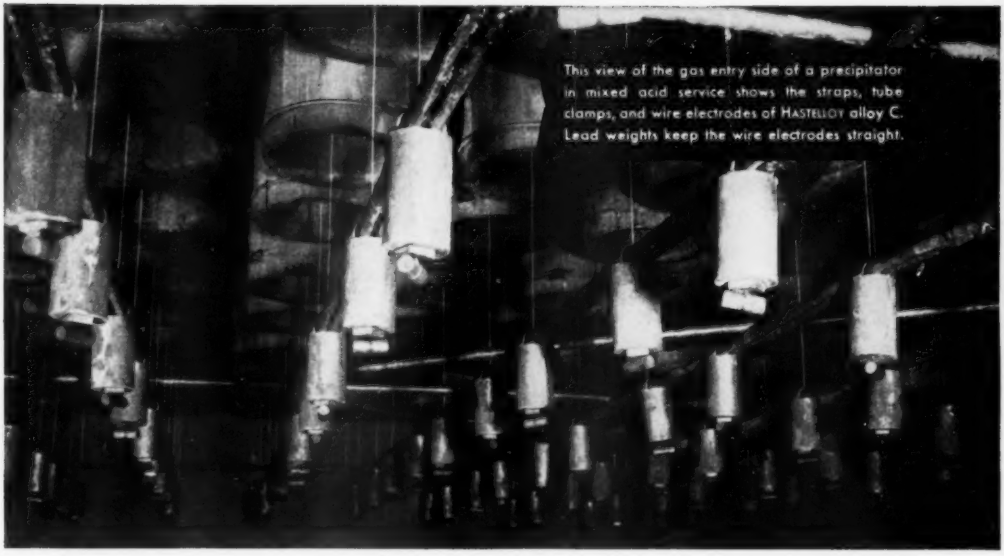
For air, gas or liquid service in the field or laboratory, the Mity-Mite's performance is unmatched by any other regulator. Wire or write today for full details.

GROVE

The reliability of Grove Valves and Regulators is proved by the thousands of successful installations handling air, gas, oil, water and other fluids. For the solution to your control problems, contact the nearest Grove representative.

MITY-MITE PRESSURE REDUCING REGULATORS

GROVE REGULATOR CO. 85th and HOLLIS STREETS, EMERYVILLE, CALIFORNIA
1801 CALUMET, HOUSTON 4, TEXAS • 225 EAST 68TH ST., NEW YORK 21, N. Y.



This view of the gas entry side of a precipitator in mixed acid service shows the straps, tube clamps, and wire electrodes of HASTELLOY alloy C. Lead weights keep the wire electrodes straight.

Precipitators Improved...

WITH NICKEL-ALLOY ELECTRODES

Electrostatic precipitators for removing corrosive liquids and solid particles from industrial process gases give better and longer service, without maintenance, when HASTELLOY alloy wire is used for electrodes. The alloy has excellent mechanical strength (130,000 psi) and is not attacked by the corrosive agents. This combination of properties makes it possible to use electrodes that are only 0.073 in. in diameter. The effective diameter of the lead-covered wire formerly used in most units was more than 0.500 inch. The smaller cross-section of the HASTELLOY alloy wire permits the use of higher voltages with a more uniform corona pattern.

HASTELLOY alloy C electrodes have been installed in mist precipitators where hydrochloric, sulphuric, sulphurous, and mixed acids were present. A recent check on an installation in an acid plant showed that the alloy C wires experienced no weight loss after a year's operation. Lead-covered steel wires, on the other hand, lasted an average of 11 months with electrode failure at least once a week.

For information on wrought forms of HASTELLOY alloy, write for the booklet, "HAYNES Wrought Alloys Price List."

HAYNES TRADE-MARK *alloys*

"Haynes" and "Hastelloy" are trade-marks of Union Carbide and Carbon Corporation.

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
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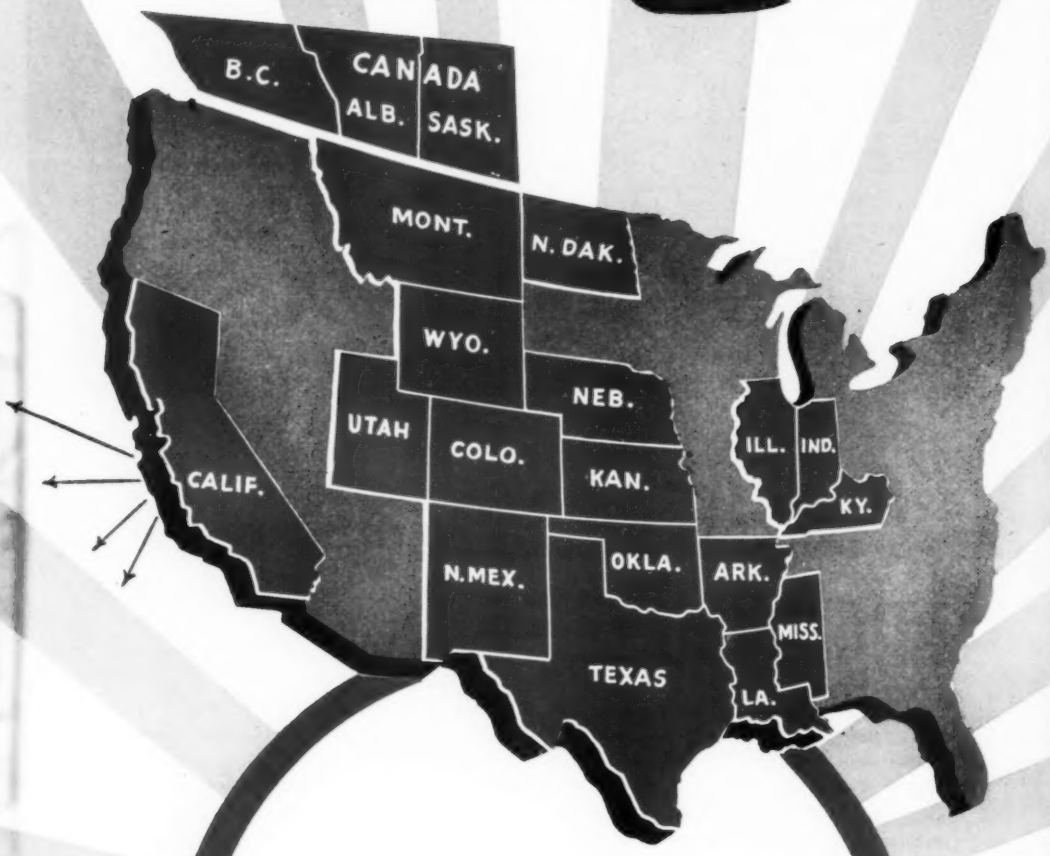
NOW!.. ONE Great



Johnston Testers, Inc. has purchased the entire holdings of four Johnston corporations and centralized the oil industry's leading formation testing business into a single, worldwide organization. In the transaction the new company took over the manufacturing and service facilities of the following corporations, all of which grew, through continuous expansion, from the original organization that pioneered the art of formation testing in the late 1920's: M. O. Johnston Oil Field Service Corporation, Los Angeles; Johnston Oil Field Service Corporation, Houston; M. O. Johnston Oil Field Service, Ltd., Edmonton, Canada; and M. O. Johnston Oil Field Export Corporation, Los Angeles.

Manufacturing facilities include plants in Los Angeles and Houston for the design and manufacture of a complete line of drill stem testing equipment and other Johnston specialty tools. Available for sale, for use in foreign countries and for service in the United States and Canada. Service facilities include more than 60 service depots located at strategic points in active drilling areas.

- Johnston Testers, Inc. now provides every dependable service of the four former corporations . . . *and more!*

World-Wide.....

JOHNSTON ORGANIZATION

M. O. Johnston, Chairman of the Board

W. B. Taylor, President

SHOOT TEST

JOHNSTON TESTERS, INC.

5702 NAVIGATION BLVD. • HOUSTON, TEXAS

FORMATION AND CASING TESTING — JOHNSTON

SERVICE BRANCHES IN ALL ACTIVE AREAS

There's a Johnston Service Representative Near You

Bucyrus-Erie Blade Equipment MAKES HORSEPOWER PAY OFF

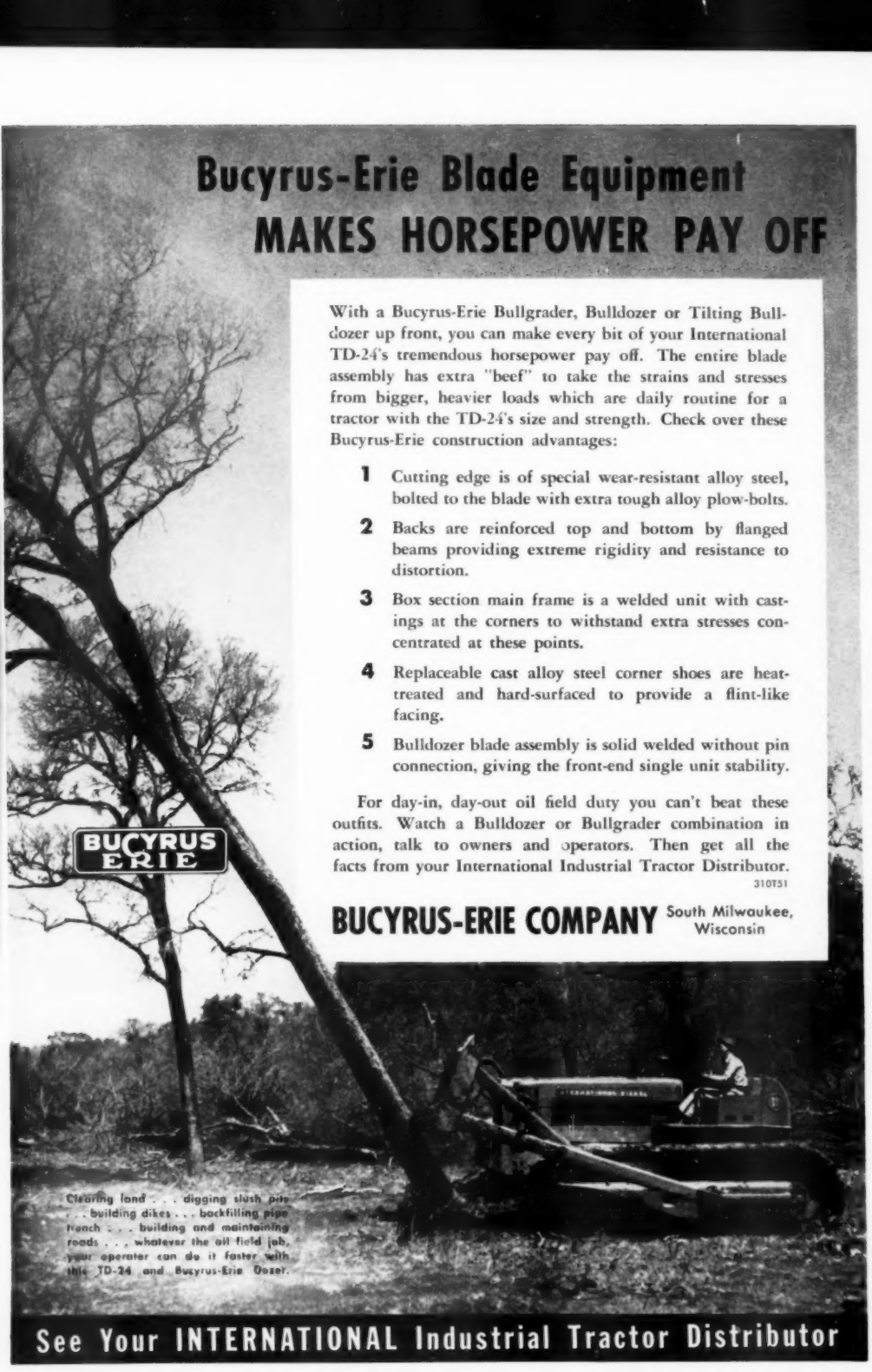
With a Bucyrus-Erie Bullgrader, Bulldozer or Tilting Bulldozer up front, you can make every bit of your International TD-24's tremendous horsepower pay off. The entire blade assembly has extra "beef" to take the strains and stresses from bigger, heavier loads which are daily routine for a tractor with the TD-24's size and strength. Check over these Bucyrus-Erie construction advantages:

1. Cutting edge is of special wear-resistant alloy steel, bolted to the blade with extra tough alloy plow-bolts.
2. Backs are reinforced top and bottom by flanged beams providing extreme rigidity and resistance to distortion.
3. Box section main frame is a welded unit with castings at the corners to withstand extra stresses concentrated at these points.
4. Replaceable cast alloy steel corner shoes are heat-treated and hard-surfaced to provide a flint-like facing.
5. Bulldozer blade assembly is solid welded without pin connection, giving the front-end single unit stability.

For day-in, day-out oil field duty you can't beat these outfits. Watch a Bulldozer or Bullgrader combination in action, talk to owners and operators. Then get all the facts from your International Industrial Tractor Distributor.

310T51

BUCYRUS-ERIE COMPANY South Milwaukee, Wisconsin



Clearing land . . . digging slush pits . . . building dikes . . . backfilling pipe trench . . . building and maintaining roads . . . whatever the oil field job, your operator can do it faster with this TD-24 and Bucyrus-Erie Dozer.

See Your INTERNATIONAL Industrial Tractor Distributor

...from billet to tube to fitting

From this modern control room, every step in the heating, piercing, rolling and reduction of seamless tubes is closely monitored. This is typical of the highly specialized equipment demanded by the Globe precision process . . . insuring high quality and close tolerances.

GLOBE highly specialized process controls are used to produce the finest in WELDING FITTINGS

For complete information on the finest welding fittings available anywhere, send for the Globe Welding Fittings Catalog.

Globe precision-process manufacture *begins with the billet* — continues through the making of the seamless steel tube — (Globe alone among welding fitting manufacturers produces seamless steel tubes) — and extends through to the production of the finished fittings.

Because Globe has highly specialized controls — at every stage of manufacture *in its own plant* — you can be sure of uniform high quality seamless welding fittings when you specify Globe.

GLOBE STEEL TUBES CO.
MILWAUKEE 46, WISCONSIN

Chicago, Cleveland, Detroit, New York, Philadelphia, St. Louis, Denver, Houston, San Francisco, Glendale, Cal.

Producers of Globe seamless stainless steel tubes — Gloweld welded stainless steel tubes — alloy — carbon — seamless steel tubes — Globeiron (high purity ingot iron) seamless tubes — Globe Welding Fittings.

LINEAR
The Measure of Quality in
PACKINGS
PRECISION MOULDED
"V" AND "O"
RINGS
AMERICA NEEDS SCRAP TO MAKE MORE STEEL
Jones & Laughlin Supply Company
EXPORT: 405 Lexington Avenue, New York, N. Y., U.S.A.
General Offices: TULSA, OKLAHOMA
82 STORES • 17 OFFICES • 7 RESIDENT SALESMEN
J&L STEEL
Subsidiary of Jones & Laughlin Steel Corporation
"...here's MY warehouse!"

They Say—

No Horsepower Shortage

"There is no necessity of running either 'out' or 'short' of oil in the foreseeable future. There is, however, a real necessity to encourage the greater expansion required by increasing demands for petroleum products.

"The quantity of new oil found since World War 11 exceeded the amount produced by 7,500,000,000 or 160 per cent.

"Beyond the reserves of crude oil are the almost inexhaustible reserves of natural gas, coal, shale, and tar sands from which gasoline, kerosine, and fuel oils and lubricants can be made. The technology of these processes is known. Their application waits only on necessity.

"Their existence, along with new forces of energy such as atomic power, gives final assurance that this nation need never be short of horsepower for the generations of the future."

Russell B. Brown, general counsel, Independent Petroleum Association of America, addressing special conference of the National Council of Farmer Cooperatives, Chicago.

Not All Are Lily White

"Some land owners in this section of the Julesburg Basin are learning that there are ways of drilling an oil well, and then there are other ways.

"A fast talker comes along and convinces the land owner that he can't trust the big companies. He is persuaded to go in on a quick-action drilling deal. The fast-talker will go out and promote the money (the land-owner being nicked for a sizable bundle, himself) and there'll be a well drilled before you know it.

"It usually works out that way, too. The well is drilled so fast that the land owner hardly has time to settle back in his chair. The fact that the hole isn't adequately tested as the bit bores its way into the subterranean mysteries of Mother Earth is of little consequence to the promoter. He has the dough in hand and the quicker they drill the hole, the less it costs. Of course, if they should accidentally hit a gusher that knocks the derrick down, that would be fine, too. But a dry hole is acceptable because it still yields a profit (for the promoter, that is).

"Fortunately, most of the men who have been active in putting together drilling deals in this territory are honorable and honest and are deserving of support. But we've had a few stinkers who have loused up the apple barrel for all the good ones. We think their stripes are beginning to show. Inevitably, they leave town looking a lot more prosperous than when they arrived."

Editorial in the Sidney, Neb., Telegraph.

CALENDAR

February

Instrument Society of America, New York Section, power-plant symposium, Hotel Statler, New York City, February 7-8.

Western Petroleum Refiners Association, regional technical and industrial relations meeting, Beaumont, Tex., February 7-8.

First International Conference on Underground Gasification of Coal, Birmingham and Gorgas, Ala., February 12-14.

American Petroleum Institute, Division of Marketing, lubrication-committee meeting, Hotel Book-Cadillac, Detroit, February 18-19.

Wisconsin Petroleum Association, twenty-sixth annual convention and equipment show, Milwaukee Auditorium, Milwaukee, February 26-27.

American Association of Petroleum Geologists, Rocky Mountain Section, annual meeting, Salt Lake City, February 28-29.

Natural Gasoline Association of America, Permian-Basin regional meeting, Lincoln Hotel, Odessa, Tex., February 29.

March

Manufacturers Standardization Society of Valve and Fittings Industry, annual meeting, Hotel Commodore, New York City, March 3-5.

American Society for Testing Materials, spring meeting, Hotel Statler, Cleveland, March 3-7.

Pacific Coast Gas Association, annual

CALL

For prompt, personal service on steel, contact the nearest of thirteen conveniently located Ryerson plants. Though stocks are currently out of balance from a size standpoint, we can probably meet most of your requirements. Please extend government ratings whenever they apply.

RYERSON

PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled and cold finished

STRUCTURALS—Channels, angles, beams, etc.

PLATES—Many types including Inland 4-Way Safety Plate

SHEETS—Hot and cold rolled, many types and coatings

TUBING—Seamless and welded, mechanical and boiler tubes

ALLOYS—Hot rolled, cold finished, heat treated. Also tool steel

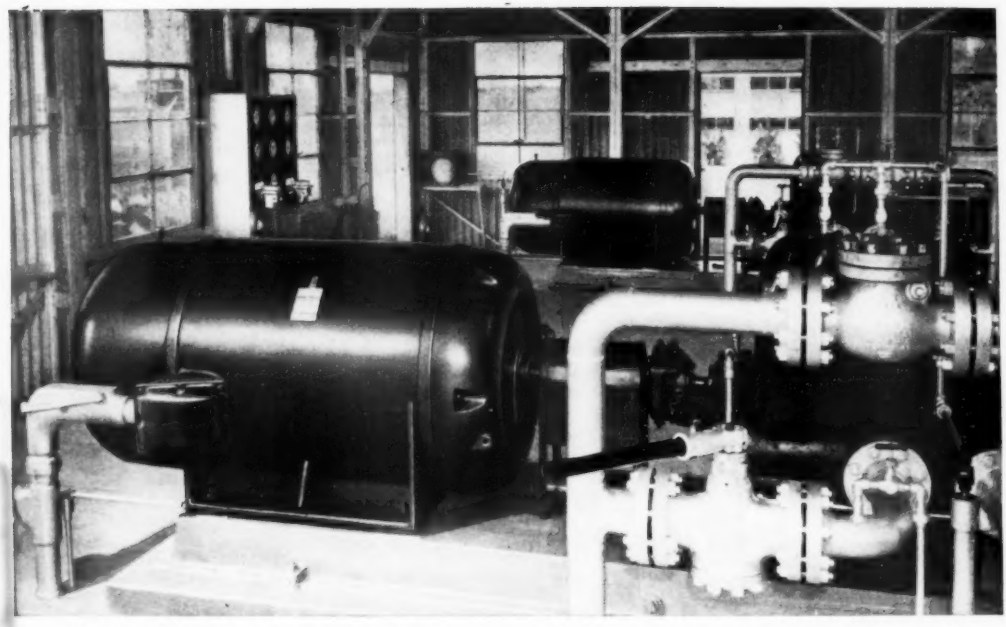
STAINLESS—Allegheny bars, plates, sheets, tubes, etc.

BABBITT—Five types, also Ryertex plastic bearings

MACHINERY & TOOLS—For metal fabrication

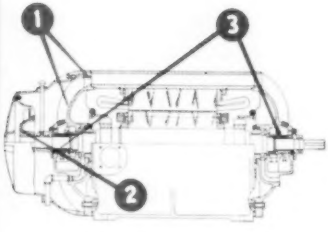
FOR STEEL

Joseph T. Ryerson & Son, Inc. Plants at: New York • Boston Philadelphia • Detroit • Pittsburgh • Buffalo • Chicago Milwaukee • St. Louis • Los Angeles • San Francisco



Driving the main pumps in a Texas pipeline station, these two G-E explosion-proof induction motors—each rated 350 hp—are controlled either from master panel in control building outside or from the two G-E explosion-proof push-button starters at left.

No need to isolate these motors!



Let's look inside!

1. **Double-shell construction** utilizes inner shell to protect electrical parts; outer shell to direct flow of cooling air.

2. **Non-sparking fan** draws in air through protective screen for efficient cooling.

3. **Bearing completely enclosed** in a cast-iron housing with long running clearances to prevent entrance of dirt and liquids.

G-E Tri-Clad* explosion-proof motors—as in this products pipeline station in Texas—eliminate need for firewall, cut station construction costs

Supplying a variety of oil products, this major oil company operates an extensive pipeline system from Texas to markets in northeastern areas. And for 5 years, in several of the line's pumping stations, General Electric explosion-proof induction motors have been doing a reliable, minimum-maintenance job in helping to keep throughput at a maximum.

Because they require no expensive, specially-built vaults, and no firewall between motors and pumps, G-E explosion-proof motors cut station construction costs, save engineering and installation time. You can locate your equipment solely for convenience, ease of maintenance, and economy of space. And because they do away with remote coupling and shaft seal at the firewall, they require less maintenance, too.

Whatever *your* pipeline electrification needs, with General Electric you're sure of the broadest line of motors, control and power distribution equipment—co-ordinated for maximum efficiency. The petroleum specialist in your nearest G-E office has more information, but in the meantime send for Bulletin GEA-5423. *General Electric Company, Schenectady 5, N. Y.*

*Registered trade-mark of General Electric Co.

661-33

Everything you need to cut oil pipeline costs —ELECTRICALLY!

GENERAL ELECTRIC

technical services conference, Fresno, Calif., March 5-6.

American Petroleum Institute, Division of Production, southwestern district, Washington-Youree Hotel, Shreveport, March 5-7.

National Association of Corrosion Engineers, eighth annual conference and exhibition, Galvez Hotel, Galveston, Tex., March 10-14.

Illinois Petroleum Marketers Association, annual convention, Hotel Sherman, Chicago, March 11-13.

Texas Oil Jobbers Association, Inc., annual spring convention and refiners and suppliers exhibit, Hotel Adolphus, Dallas, March 12-13.

American Institute of Chemical Engineers, regional meeting, Atlanta, March 16-19.

Ohio Petroleum Marketers Association, annual convention and marketing exposition, Deshler-Wallick Hotel, Columbus, Ohio, March 18-20.

American Petroleum Institute, Division of Production, Mid-Continent district meeting, Broadview Hotel, Wichita, Kans., March 19-21.

American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, and Society of Exploration Geophysicists, joint annual meeting, Biltmore Hotel, Los Angeles, March 23-27.

Texas Independent Producers and Royalty Owners Association, sixth annual meeting, Fort Worth, March 27-28.

North Texas Oil and Gas Association, twenty-second annual meeting, Kemp Hotel, Wichita Falls, Tex., March 29.

Western Petroleum Refiners Association, annual meeting, Plaza Hotel, San Antonio, March 31-April 2.

Mid-West Gas Association, annual meeting, Hotel Radisson, Minneapolis, Minn., March 31-April 2.

April

Pacific Coast Gas Association, annual transmission conference, Berkeley, Calif., April 2-3.

American Petroleum Institute, Division of Production, eastern district, Hotel William Penn, Pittsburgh, April 2-4.

Florida-Georgia Gas Association, annual convention, Soreno Hotel, Saint Petersburg, April 3-5.

Missouri Liquefied Petroleum Gas Association, Hotel President, Kansas City, Mo., April 7-9.

Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, April 8-10.

Petroleum Industry Electrical Association and Petroleum Electrical Supply Association, twenty-fourth annual joint conference, Mayo Hotel, Tulsa, April 14-17.

American Institute of Electrical Engineers, District 7 meeting, Hotel Jefferson, St. Louis, April 15-17.

National Petroleum Association, semiannual meeting, Hotel Cleveland, Cleveland, April 16-18.

American Petroleum Institute, Division of Transportation, pipe-line conference, Blackstone Hotel, Fort Worth, April 21-23.

American Petroleum Institute, Division of Production, Rocky Mountain district, Gladstone Hotel, Casper, Wyo., April 24-25.

Indiana Gas Association, annual meeting, French Lick Springs Hotel, French Lick, Ind., April 24-25.

Independent Petroleum Association of America, midyear meeting, Deshler-Wallick Hotel, Columbus, Ohio, April 28-29.

Natural Gasoline Association of America, annual meeting, Rice Hotel, Houston, April 30-May 2.

May

American Geophysical Union, thirty-third annual meeting, National Academy of Sciences, National Research Council, Washington, D. C., May 3-7.

Interstate Oil Compact Commission, spring meeting, Phoenix, Ariz., May 9-10.

American Institute of Chemical Engineers, regional meeting, French Lick, Ind., May 11-14.

American Association of Petroleum Geologists, regional meeting, Mayo Hotel, Tulsa, May 12-13.

American Gas Association, Natural Gas Department, spring meeting, Biltmore Hotel, Los Angeles, May 12-13.

Annual Liquefied Petroleum Gas Association convention and trade show, Palmer House, Chicago, May 12-14.

American Petroleum Institute, Division of Refining, seventeenth midyear meeting, San Francisco, May 12-15.

Pennsylvania Gas Association, Wernersville, Pa., May 13-15.

American Petroleum Institute, Division of Production, Pacific Coast district, Biltmore Hotel, Los Angeles, May 15-16.

American Petroleum Institute, division of marketing, midyear meeting, Copley Plaza, Boston, May 18-19.

Gas Appliance Manufacturers Association, annual meeting, Broadmoor Hotel, Colorado Springs, Colo., May 21-23.

American Gas Association, production and chemical conference, Hotel New Yorker, New York, May 26-28.

Society of Exploration Geophysicists, Gulf Coast regional meeting, Rice Hotel, Houston, May 29-30.

Seventh annual short course in gas technology, sponsored by the Southern Gas Association, Texas College of Arts and Industries, Kingsville, Tex., May 29-31.

June

Society of Automotive Engineers, summer meeting, Ambassador and Ritz-Carlton Hotels, Atlantic City, N. J., June 1-6.

Pennsylvania Grade Crude Oil Association, annual meeting, Hotel William Penn, Pittsburgh, June 5-6.

Canadian Gas Association, Chateau Frontenac, Quebec, June 8-12.

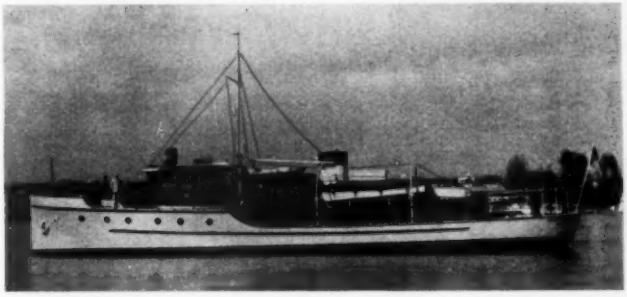
American Petroleum Institute, midyear standardization meeting, Brown Palace Hotel, Denver, June 9-14.

Western Petroleum Refiners Association, regional technical and industrial-relations meeting, Broadview Hotel, Wichita, Kans., June 12-13.

International Gas Conference, Brussels, Belgium, June 16-22.

OCEAN GOING • HEAVY DUTY !

DIESEL POWERED VESSEL — FOR OFF SHORE WORK •



LENGTH 96′ BEAM 20′ DRAFT 9′6″

CRUISING RANGE 2500 MILES SPEED 10 to 12 KNOTS

An unusual ship . . . one of the most seaworthy vessels on the Pacific Coast today. A vessel that will travel under most adverse sea conditions. . . . Its sturdily built hull, its wide beam, plus its deep draft gives it great stability in heavy seas.

To an OIL COMPANY . . . doing off shore drilling, servicing to and from operations, TOWING, deep sea diving, SEISMIC surveying, carrying operators and crew by water, or as an OFFICIAL'S YACHT . . . THIS sturdy vessel is IDEAL.

During the past eight months this vessel has been mechanically rebuilt, redecorated and refurnished. It is in EXCELLENT CONDITION, ready for OCEAN-WIDE travel on a few hours notice.

This vessel is OFFERED for SALE at less than 25% of its replacement value. The owner invites rigid inspection.

WIRE OR WRITE TO-DAY!!
for BROCHURE & PRICE

Robert B. Paysee owner

Rm. 909 111 W. Jackson Blvd. Chicago, Ill.

WILLSON®

protection for industrial workers

keeps you on the safe side

WILLSON SAFETY EQUIPMENT

Like these sturdy welding goggles, all Willson safety equipment is made after careful study of industry's needs. Through this continuing research you get many comfort and safety improvements first in Willson products. Ask for Willson—largest line of goggles and helmets for gas and arc welding.

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Petroleum Equipment Suppliers Association, Mark Hopkins Hotel, San Francisco, June 22-25.

Michigan Gas Association, annual meeting, Grand Hotel, Mackinac Island, Mich., June 23-24.

American Society for Testing Materials, annual meeting, Hotel Statler, New York, June 23-27.

American Institute of Electrical Engineers, summer general meeting, Nicollet Hotel, Minneapolis, Minn., June 23-27.

August

Society of Automotive Engineers, national West Coast meeting, Fairmont Hotel, San Francisco, August 11-13.

American Institute of Electrical Engineers, Pacific general meeting, Westward Ho Hotel, Phoenix, Ariz., August 19-22.

September

Pacific Coast Gas Association, Ambassador Hotel, Los Angeles, September 3-5.

National Petroleum Association, fiftieth annual meeting, Hotel Traymore, Atlantic City, N. J., September 10-12.

American Institute of Chemical Engineers, regional meeting, Palmer House, Chicago, September 11-13.

Western Petroleum Refiners Association, regional meeting, Hotel Henning, Casper, Wyo., September 25-26.

American Association of Oilwell Drilling Contractors, annual meeting, Skirvin Hotel, Oklahoma City, September 26-30.

October

California Natural Gasoline Association, twenty-seventh annual fall meeting, Ambassador Hotel, Los Angeles, October 9-10.

Texas Mid-Continent Oil and Gas Association, thirty-third annual meeting, Hotel Texas, Fort Worth, October 13-15.

American Institute of Electrical Engineers, fall meeting, New Orleans, October 13-17.

Natural Gasoline Association of America, southern regional meeting, Blackstone Hotel, Tyler, Tex., October 19.

Independent Petroleum Association of America, annual meeting, Mayo Hotel, Tulsa, October 20-21.

American Oil Chemists' Society, fall meeting, Netherlands Plaza Hotel, Cincinnati, October 20-22.

Society of Automotive Engineers, national transportation meeting, Hotel William Penn, Pittsburgh, Pa., October 22-24.

Southern Gas Association, annual convention, Atlantic City, N. J., October 27-30.

American Gas Association, annual convention, Atlantic City, N. J., October 27-30.

November

Society of Automotive Engineers, national diesel engine meeting, Chase Hotel, (tentative), St. Louis, November 3-4.

Society of Automotive Engineers, national fuels and lubricants meeting, Mayo Hotel, Tulsa, November 6-7.

Oil Industry Information Committee, Conrad Hilton Hotel, Chicago, November 8-13.

American Petroleum Institute, thirty-second annual meeting, Conrad Hilton Hotel and Palmer House, Chicago, November 10-13.

American Society of Mechanical Engineers, Statler Hotel, New York City, November 30-December 5.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month. Greater Dallas Club.

Houston Nomads, second Monday of each month. Ye Olde College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month. Jonathan Club. Annual inaugural ball, Embassy Room, Ambassador Hotel, February 16.

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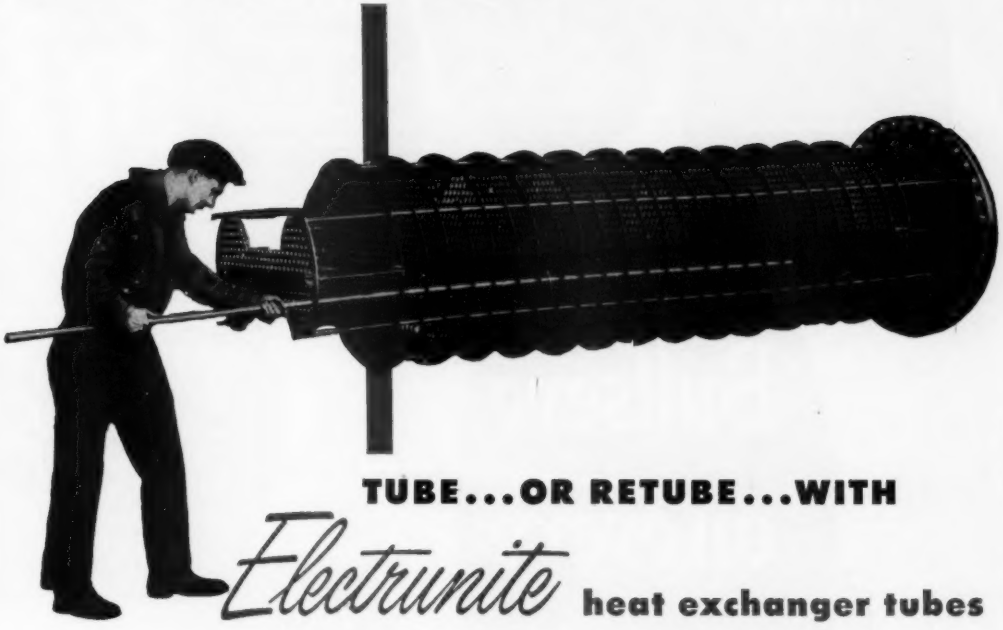

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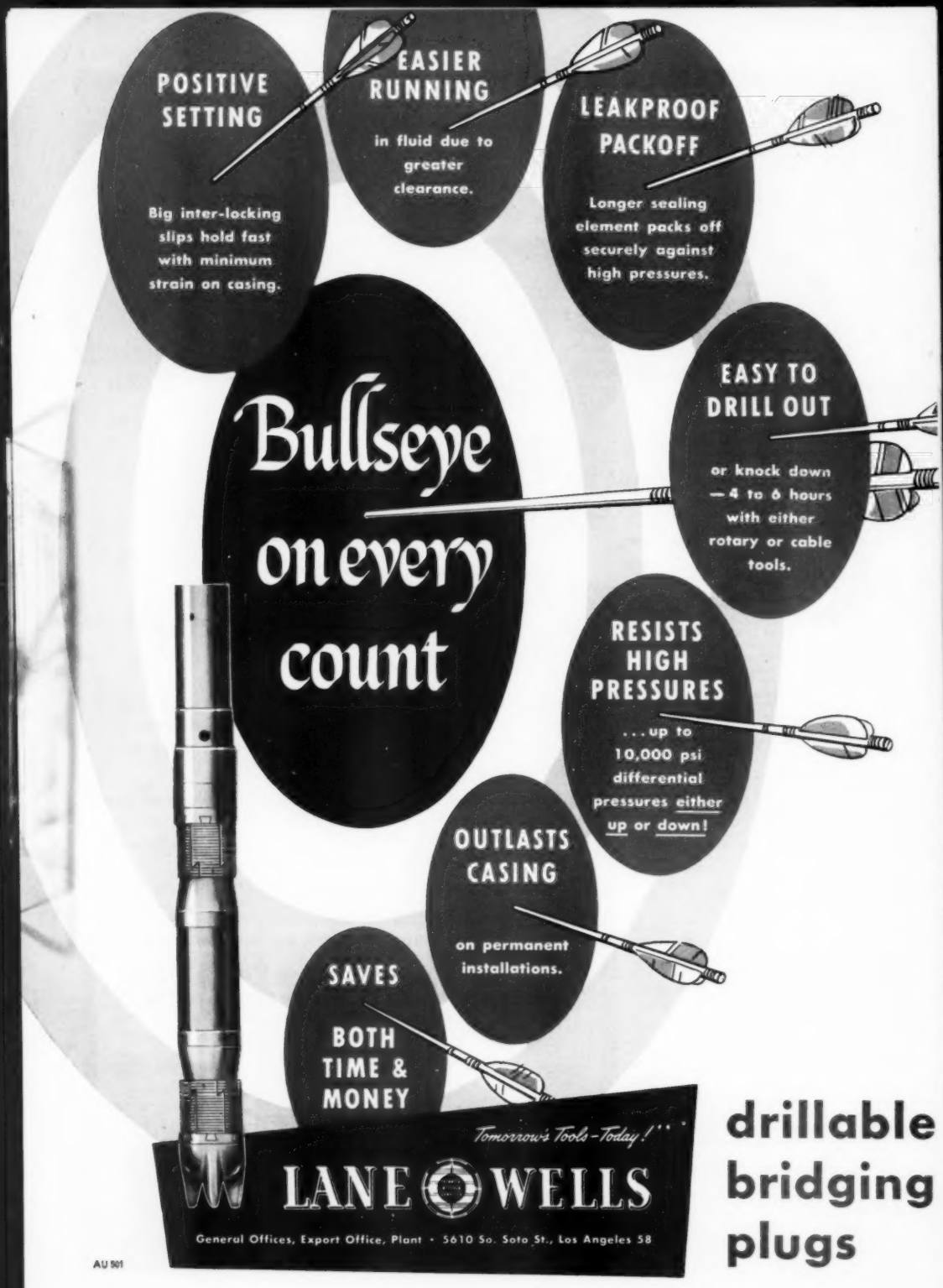
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JOURNALLY Speaking

Phooey on the Atom

WITH half the civilized world quaking in their boots in fear of the A-bomb, it is reassuring to learn that there is one group of citizens that is not at all awed by the potentialities of the atom. This is the American Geological Institute, which maintains headquarters in Washington and might be described as the philosophical organization of the rock-hound profession.

The institute recently asked its members to gaze into their crystal balls and see what the future holds for men of the earth-science trade. The concensus was quite optimistic. The was general unanimity that during the next 50 years atomic fission will not become an important source of energy for industrial purposes, so the oil and coal men don't need to lose any sleep over that bugaboo.

On the question of whether we are running out of oil, these forward-looking geologists refused to view with alarm. They agreed that some time in the future, petroleum may not be produced in sufficient quantities to fill all demands for liquid fuels so part of the supply may have to be synthesized from coal or squeezed out of oil shale—say along about 1975. But they can't even get excited about the prospect for that business because they figure that by the year 2000 everything will be powered by photosynthesis or some form of solar energy. Such a display of calmness and confidence is mighty refreshing in these days when pessimists and alarmists get such a popular ear.

Hijinx on the Rio Grande

THE oil industry has put on all kinds of shows, but according to the publicity reaching us the oil show held January 22-25 in Mission, Tex., must have been the goldangdest ever. Reason is that it was all mixed up with grapefruit juice, eggplant skin, and the Duchess of Onion.

It seems that Mission claims to be—is, for all we know—the nerve center of the citrus-and-vegetable belt of the Rio Grande Valley and has been holding a Citrus Fiesta every January for we don't know how many years. This year an oil show was included as an added attraction and in due recognition of the fact that Starr County is getting to be quite an oil area. However, as much as the Missionaries, or whatever they call themselves, appreciate the advent of oil, they still give first place in their hearts and their celebrations to products of their topsoil, for the oil show turned out to be a sideshow to the citrus show.

That Citrus Fiesta must have been something. It was reigned over by Queen Citrianna, the Princess of Grapefruit Blossom, duchesses of various vegetables, and assorted lesser royalty of the horticultural realm. (Next year Oil Royalty ought to break into this peerage of knighthood in flower with a Marquise of Pumpjack, or something.)

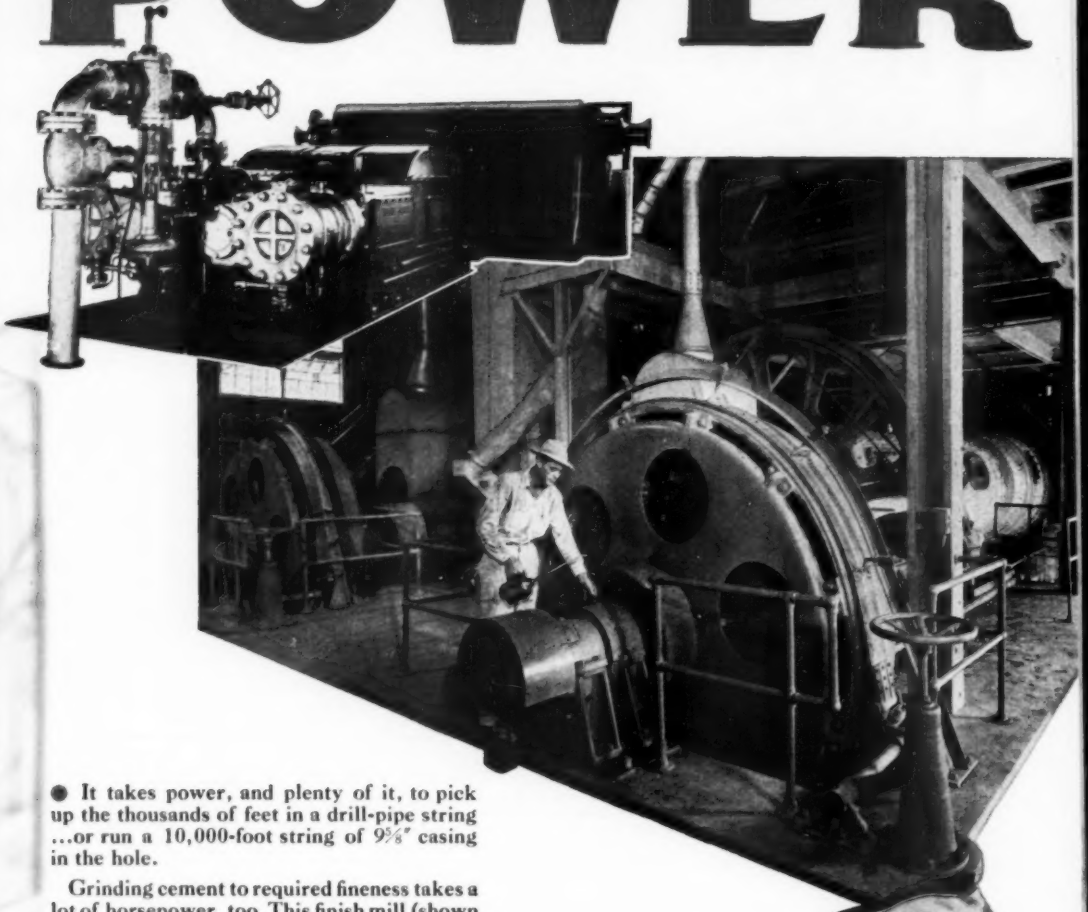
But the feature that should have appealed most to any red-blooded oil man was the Royal Ball where everybody (we are solemnly assured) wore costumes made entirely of fruits or vegetables. One gal came decked out solely in sliced oranges, another was arrayed in corn meal held on with rubber cement, and the belle of the ball pirouetted in a purple evening gown composed of pieces of eggplant skin joined with cellophane tape. Even the little kiddies got into the act with similar adaptations of the Garden of Eden school of dressmaking, "the cutest things you could imagine," the press agent wrote. We'll bet they were. There never was an oil show like that before.

Mobilization Note

WHENEVER we hear that an oil man has changed his address we send him a postcard in hopes of eliciting some information which will make a good item for the personals page of our favorite oil publication. The other day we got one back from a man who noted that his former position was petroleum production engineer and his new position is second lieutenant in the Air Force, and on the line where we asked him if this was a promotion, he wrote "Ha!" We won't disclose his identity because his attitude, if we correctly interpret that "Ha!", might not be considered complimentary by his present employers.

—Henry D. Ralph.

POWER



● It takes power, and plenty of it, to pick up the thousands of feet in a drill-pipe string ...or run a 10,000-foot string of 9⅝" casing in the hole.

Grinding cement to required fineness takes a lot of horsepower, too. This finish mill (shown at right) is a steel cylinder 9'-6" in diameter by 40' in length, weighing 285,000 lbs., charged with 165,000 lbs. of steel balls . . . making a total load of 450,000 lbs. A 1000-horsepower electric motor spins this loaded cylinder at 24 revolutions per minute, in producing 600 sacks of cement an hour — quality cement, made to meet the exacting demands of the Oil Industry.

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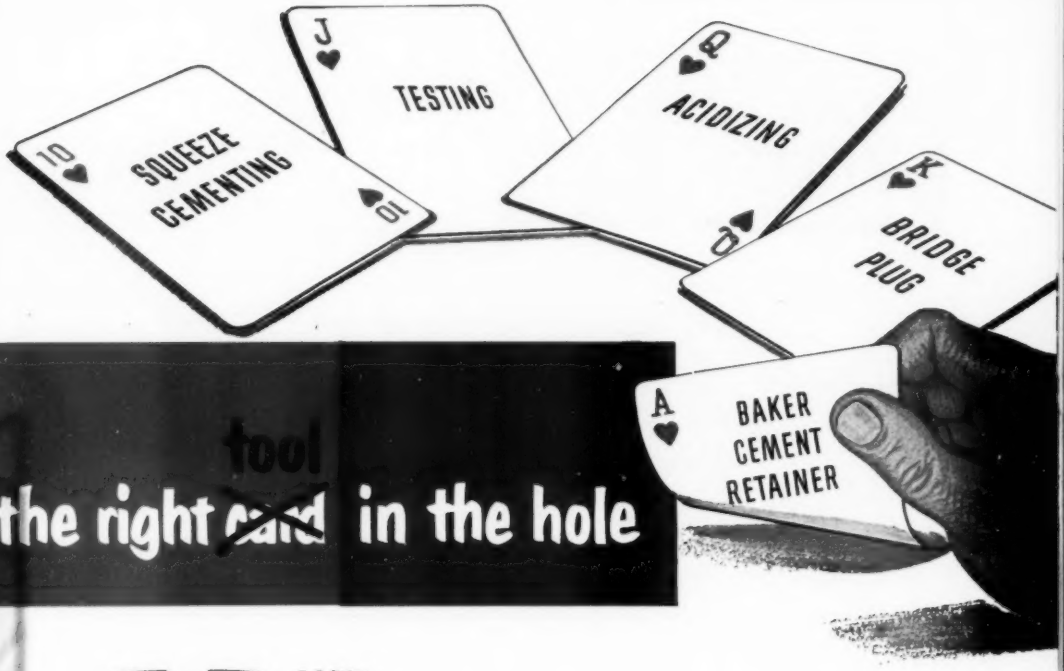

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Somebody has to store the stuff

THE L.P.G. business has experienced another of its periodic embarrassments over a local shortage. Nearly every winter consumers and distributors of liquefied petroleum gas in some area run short of supplies for a brief time. This winter it happened in Oklahoma, where state officials started an investigation and some loose accusations were made against the industry.

The whole petroleum industry gets a black eye when customers are unable to obtain its products. Also, it is poor business to let this happen.

These L.P.G. shortages are always temporary and confined to a single area, and there is a specific explanation in every case. Maybe the highways were closed in by snow, or the railroads were tied up, or tank cars were being used for something else, or there was an unexpected cold snap, or the local dealers were improvident in promising more than they could deliver. Almost always there is plenty of L.P.G.—somewhere else.

THE root of the trouble is lack of storage. Everybody admits this but until now nearly everyone has evaded the responsibility for providing storage. The producer wanted the distributor to carry the load, the distributor wanted the producer to do it, and both said the consumer ought to install bigger tanks.

The fact is that all have been at fault. The fast-growing L.P.G. industry has been living a hand-to-mouth existence, biting off new business faster than it could digest it. There has not been enough storage anywhere along the line. This is a hazardous position for a highly seasonal business which is subject to the vagaries of weather and transportation conditions.

Fortunately, the whole industry has now realized that this is an all-industry responsibility, and has taken steps to face it.

Producers now have steel storage for 5 days' output, on the average, and are aiming at 7 days' storage at the plants. In addition, by the end of this year producers will have close to 3,000,000 bbl. of underground storage, much of it in consuming areas. Distributors have set a goal for themselves of 2 weeks' storage at the maximum demand rate.

And the whole industry is financing a campaign to induce consumers to put in bigger tanks. Instead of cussing the householder for having such a small tank, the industry now realizes that it was shortsighted in undertaking to service a consumer who couldn't take a decent slug at one delivery.

SOMEBODY has to store the stuff, and the buck can't be passed to the consumer because it was the industry which "sold" him on an L.P.G. installation. It's mighty fine that the industry is now shouldering and dividing the responsibility. As soon as there is adequate and balanced storage all up and down the line the L.P.G. industry can eliminate some of its uneconomic peaks and valleys and just about all of its consumer gripes. And so everybody gains.

THIS WEEK

GET THIS STRAIGHT.—Pipe like this should be straightened and reused if possible and if not it should be sent straight to a scrap dealer. That's the word straight from Washington to the entire oil industry: Examine every unused piece of metal and equipment on the property; salvage what can be put back into use immediately; scrap the rest to make more steel.

PRODUCTION—New techniques to increase production, improve drilling-in practices being tried in Spraberry area of West Texas. . . . Key to more production lies in getting wells connected to as many natural fractures as possible, operators believe. . . . ¶PAD wants crude producibility of 1,509,000 bbl. daily, with allowance for depletion, by end of 1953 to provide "cushion" against emergencies. . . .

STEEL—PAD sets up new system of tubular-goods allocation to encourage use of conversion steel by oil, gas operators. . . . ¶Additional warehouses designated by PAD for distribution of tubular goods. . . . Tonnages increased at five points throughout Mid-Continent area to bring supplies in line with level of activity. . . . ¶Journal survey reveals that there isn't as much oil-field scrap as steel industry would like, but probably more than oil industry realizes. . . .

REFINING—Use of formaldehyde as refining agent for cracked, virgin gasoline stocks held promising by Standard Oil Development chemists, who say use adds stability, cuts losses, and lessens corrosiveness. . . . ¶Meeting of policy committee of Oil Workers International Union in Kansas City points to possibility of major strike in petroleum industry. . . . Two major refineries already strikebound and labor problems becoming acute at third. . . . ¶PAD wants United States refining capacity increased by 250,000 bbl. daily.

INDUSTRY—High prices now being paid for oil, gas rights reflect increasing costs of development, emphasizes high competition for discoveries. . . . ¶NPC told that new sources of energy will reduce world demand for oil before supplies of petroleum diminish. . . . ¶PAD says it wants petroleum industry, worldwide, to be able to cope with any emergency, asks 80,000 new wells for U. S. in 18 months, with 25,000 of them to be drilled in the last 6 months of this year. . . .

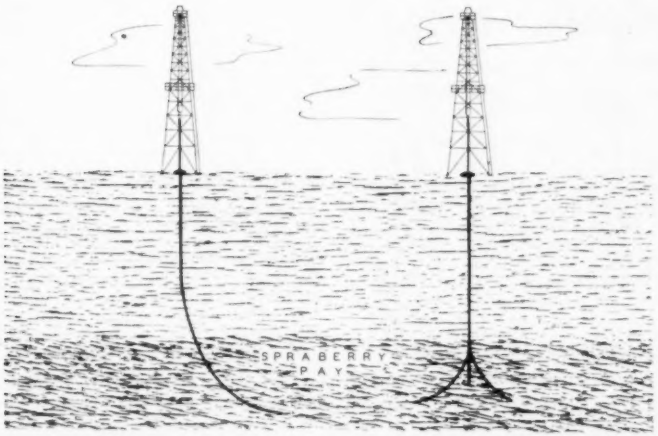
PETROCHEMICALS—Texas Eastman's Longview, Tex., plant now turning propane and natural gas into chemicals to be used in making plastics. . . . ¶Close coordination between petroleum and chemicals industries results in growth of both, C.C.D.A. group told. . . . Rapid growth of petrochemicals reviewed. . . .

ACTIVITY—Production of crude and lease condensate averaged 6,204,850 bbl. daily for the week ended January 26, up 10,910 bbl. daily. . . . ¶Total well completions increased 23 wells to 884. . . . Wildcat completions totaled 189 for the week compared with 202 for previous week and 175 for some week last year. . . . ¶The seventh successive weekly decrease in number of rotary rigs operating in United States brought the total down to 2,706 on January 28. . . .

TRENDS—Distillate inventories on January 26 were 7,453,000 bbl. greater than at the same time last year, with 6,290,000 bbl. of the increase in District 2. . . . ¶Stocks in Districts 1 and 3 were up 2,346,000 bbl. and 2,919,000 bbl. respectively. . . . A small gain of 63,000 bbl. was reported for District 3. . . . ¶District 5 stocks of distillate decreased 4,165,000 bbl. or 43 per cent in the 12-month period. . . .

CANADA—Tests on Socony-Western's medium-gravity oil discovery in Saskatchewan indicate final production rate of 300 bbl. daily. . . . ¶Alberta Petroleum and Natural Gas Conservation Board won't make decision before latter part of March on applications of six companies to export natural gas from province. . . .

SUPPLY AND DEMAND—PAD head predicts a shortage of heating oils along eastern seaboard, says a 2.09-cent-a-gallon increase in tanker rates from Gulf Coast during last half of 1951 took all profits out of business. . . . ¶Exports of major petroleum products dropped to average of 190,000 bbl. daily during week ended January 4, PAD estimates. . . . ¶World supply of sulfur in 1952 expected to be 1,539,000 tons short of requirements, International Materials Conference estimates. . . .



NEW TECHNIQUES.—Humble idea to get more oil is high-angle drilling, left, to cut through more fractures. Drain holes whipstocked from straight bore are being tried by Sunray.

Spraberry Innovations

Slanted holes, drain holes being tried to increase crude output; two other ideas may improve drilling-in practices

Roy F. Carlson

MIDLAND, Tex.—The more fractures connected to a well in the vast Spraberry trend of West Texas, the better that well will produce oil.

This is the opinion of operators, who base it on the theory that a system of interconnected fractures play the primary role in reservoir drainage into the well bore.

As a result of this thinking, methods of completing the reservoir are constantly being revised or extended by new tools or procedures.

Four new methods of drilling in and completion are now being tried. Two of these are specifically aimed at connecting more of the natural-fracture patterns.

Drain holes.—One of the most recent new methods to be tried in the Spraberry is the drilling of short, virtually lateral holes off the main well bore in the pay zone. The extremely high angle holes—known as drain holes—have been used extensively in West Coast and Rocky Mountain areas but only recently have they been tried in the Spraberry. To date there have only been two trials, both in wells of Sunray Oil Corp.

Most operators believe that the fractures occur in a pattern, although its shape is unknown, and extend vertically for appreciable distances. Therefore in order to insure the drain holes intersecting fractures, four holes should be drilled at 90 degrees from each other around the well bore. In the Sunray wells only two drain holes were drilled, and it is yet too early to determine the degree of success in permanently increasing production.

These holes have been drilled under the supervision of and with tools belonging to Zublin Co. of Los Angeles. Equipment used includes standard rotary drilling tools except for the bottom portion of the drilling string.

The bottom portion is composed of a bit that is attached to a length of flexible drive pipe, formed of short dovetail-connected sections of tube, each of which acts much like a universal joint. This flexible pipe is lined with a rubber tube so that it will conduct fluid. Other joints of the flexible pipe are placed in the string above the bottom joint, depending on the length of drain hole to be drilled.

The bottom joint of the drive pipe turns through and is encased in a "kink joint" that is made up of a high-grade steel tube that is cut spirally along its length with dovetail-type joints holding adjoining parts of the spiral together. This outer tube is bent and heat treated to form an arc so that when run in a well it will be straightened and will cause the bit to bear against the side of the hole, and the bit to cut a high angle hole away from the main well bore. The outer bent tube does not turn.

High-angle drilling.—The desire to intersect more fractures that led to drain-hole drilling has also led to an attempt by Humble Oil & Refining Co. to drill a high-angle directional hole in one of its Spraberry wells. Humble obtained permission from the Texas Railroad Commission to move the surface location several hundred feet to permit bottoming the hole in the proper target area under the 40-acre location.

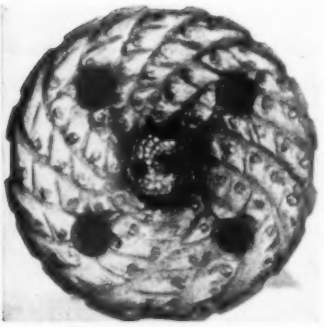
Cores from wells in the immediate vicinity were oriented by the polarization method in order to determine direction of fracture trends in the area, and the location was selected so that the high-angle hole would cut these fractures transversely.

The well was drilled to 4,900 ft. before any deflection of the hole was attempted. Beginning at this point it was planned to deflect the hole at a rate of 2° 30′ every 100 ft. of hole drilled until a 45° deflection was reached. Drilling progressed in a satisfactory manner until a depth of 6,618 ft. was reached, where it was discovered that the hole had drifted off direction, to the left, a direction contrary to what would be expected in a rotary hole. And it had drifted so far that angle could not be built up at the required rate while at the same time correcting the drifting tendency to bottom the well in the proper area.

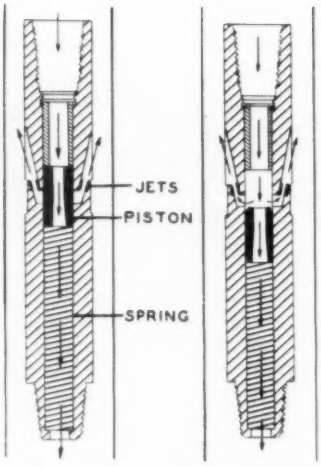
Because of this difficulty, the well is currently being pumped back, and whipstocks will be set in an attempt to kick out of the old hole and begin a new directional hole that will reach the target area. The angular deflection of 45° from vertical will be held while traversing the pay section. A vertical distance of 75 ft. of pay will be drilled, with a like distance of 75 ft. horizontally being covered. The length of this angular hole in the pay will be about 106 ft.

Diamond drilling.—Drilling equipment has also been augmented by introduction of a diamond bit that will either core or drill, at the option of the driller, without taking the bit off bottom. This bit has been used in all kinds of drilling in West Texas, including extensive use in the Spraberry for drilling in.

The drilling bit consists of a diamond core bit inside and above which is a smaller diamond bit having a full face. The large bit actually cuts a short core but this is ground off almost immediately by the smaller bit. The small bit is inserted into the drilling string on the end of a barrel that is much like a wire-line coring barrel, and is retrievable in the same manner. If it is desired to core instead of drilling the entire hole, the small bit is pulled via a wire line and a core barrel inserted in its place while the core bit remains on bottom. The



LONGER DRILLING.—This bit-within-a-bit idea, above, permits drilling with a diamond-core bit, without the necessity of coming out of the hole to remove core.



PRESSURE CONTROLLER. — New idea to keep damaging mud pressures away from tight Spraberry formation resulted in this equipment development at right.

bits and barrel are designed and manufactured by the Williams Bit & Tool Co., Greenville, Tex.

The bits provide for splitting of the fluid stream flowing down the drill stem so that the full width of the bit is washed by the fluid stream, part of it flowing to the center of the bit, and part traveling to the outside of the bit. When drilling, the smaller bit, too, has a part of the drilling-fluid stream flowing through it to wash cuttings away.

The drilling-coring combination of diamond bits has been devised to permit keeping the bit on bottom for extended periods of time to save many round trips with the drill pipe to pull cores or to change bits. The combination has been kept on bottom for as long as 6 days, drilling 720 ft. during that interval, and the bit still was not damaged or worn to any large degree. Another of the bits drilled in eight wells in the Spraberry trend, making a total of 900 to 1,000 ft. of hole and possessing a high percentage of salvage value when it was pulled the last time. A special bit has been designed for Spraberry drilling, possessing larger diamonds and deeper water courses than conventional diamond bits.

Jet subs.—Another new aid to drilling in the Spraberry are jet subs that are included in the drill string to reduce pressures on the bottom of the hole. These tools help reduce lost circulation which is troublesome up the hole from the Spraberry pay, and to reduce fluid losses into the Spraberry itself when drilling in.

The jet subs are short lengths of hollow steel fitted with threaded connections on either for coupling into the drill string. Two small hard-faced jets are located on opposite sides of the sub just above its midpoint. These jets are covered by a piston which is held in that position by a heavy spring. The piston has an orifice drilled through its center.

When the jet sub is in the drill string and circulation of drilling fluid is started, the fluid merely passes through the orifice and on down the drill pipe. However, when larger volumes are pumped, a pressure differential is built up across the piston and when this becomes large enough the piston is displaced against the spring, uncovering the jets and permitting a portion of the fluid stream to be diverted into the annulus outside the drill pipe.

The fluid that is diverted is directed upward at an angle of about 18° from vertical to provide a lifting effect on the fluid above it, thereby reducing the effective weight of the fluid column on the bottom of the hole.

Relief valves of this type are often also used in diamond-coring operations to reduce the amount of fluid flowing across the face of the bit to prevent washing out of the matrix and consequently diamond loss.

The subs are distributed by Fluid Control & Jet Service Co. of Midland, Tex.

New Treating Process

Formaldehyde as gasoline refining agent adds stability, cuts losses, lessens corrosiveness, S. O. D. chemist says

George Weber

NEWARK, N. J.—There is a promising new technique in gasoline treating.

It involves the use of formaldehyde as a refining agent for cracked and virgin gasoline stocks.

According to Erving Arundale, of the chemical division of Standard Oil Development Co.'s Esso laboratories, pilot-plant tests of this refining method have resulted in reduced losses, better lead susceptibility, greater product stability, and lessened corrosion characteristics in motor and aviation fuels.

The new development was revealed here at a meeting of the American Chemical Society's North Jersey section.

Problem involved.—Naphthas cracked thermally or catalytically contain, in addition to the desired high-octane hydrocarbons, certain undesirable components such as polyolefins, dicyclopentadienes, certain aromatics, and sulfur compounds which adversely affect stability, lead susceptibility, color, and odor.

Removing or inhibiting their action by sulfuric acid treating and addition of antioxidants involve certain shortcomings. S.O.D. accordingly has been studying the possibilities of developing a more selective refining process and one which would not be subject to the disadvantages of acid treating.

This goal appears to be realized, said Arundale, through the use of formaldehyde, either alone or in conjunction with dilute sulfuric acid.

How it started.—The investigation of formaldehyde was prompted by the knowledge that certain unsaturates are more reactive with that compound than are others.

Diolefins and some branched chain olefins condense more readily than do straight chain monoolefins. This indicated that with the proper choice of catalyst and operating conditions the removal of gum-forming olefins and polyolefins could be made more selective.

Further, the possibilities of reacting formaldehyde with mercaptans and thiophenes would improve odor and gasoline performance.

Investigators first contacted cracked naphtha with formaldehyde at room temperature in the presence of a dilute sulfuric acid solution as the so-called "catalyst." Following acid-layer separation, caustic wash, and distillation to remove heavy condensation products, they found that reduction of the acid strength and addition of formaldehyde made the process more selective than conventional concentrated acid treating.

Second step.—Arundale reports that they next looked at the effective formaldehyde content.

Using the same acid concentrations

with and without formaldehyde they found that the addition of that compound produced an improvement in stability. Also, the stability of the naphtha improved as the acid strength was increased.

From the standpoint of sulfur removed it was found that increasing the acid strength from 30 to 60 per cent resulted in some sulfur reduction. The addition of formaldehyde, however, produced a very extensive reduction in sulfur content.

Generally speaking, a catalyst solution containing 60 per cent sulfuric acid appears preferable.

Laboratory tests were run on a blend of 90 per cent thermally cracked naphtha at room temperature for 45 minutes under three sets of conditions: Using first, water for control; second, 60 per cent sulfuric acid; and third, 60 per cent acid containing varying amounts of formaldehyde.

These tests revealed that increasing formaldehyde content from 0 to 2 weight per cent based on naphtha feed increased oxidation stability and reduced sulfur gum and peroxide contents. One to 1.5 weight per cent of formaldehyde appears adequate, said Arundale.

Pilot-plant tests.—This formaldehyde-dilute acid-treating combination was then compared with conventional strong acid treating on the same naphtha blend in pilot-plant equipment.

Gasoline loss on formaldehyde treating proved to be 60 per cent, that suffered on strong acid treating being 3.4 per cent vs. 5.4 per cent for a 5-lb. per barrel concentrated acid treat. Both processes result in very stable products of low-gum content.

Next tried was formaldehyde in the absence of acid. Varying concentrations of the agent were tested at varying temperatures. Between 0.5 and 1 per cent of formaldehyde appeared adequate at temperatures between 220° and 250° C., contacting for 1 hour. Formaldehyde content and contact time can be reduced as treating temperature is raised.

Pilot-plant tests, using a heater coil and soaker-type system, were run on this so-called thermal - formaldehyde process. Formaldehyde of 0.5 to 2.0 weight per cent contacted for ½ hour at 250° C. resulted in an increase in oxidation stability without any appreciable loss in octane number. Engine tests indicated improved cleanliness characteristics and treating losses range between 1 and 1.5 per cent.

Examining desulfurization, researchers first treated a 48 copper number West Texas virgin naphtha with 5 lb. per barrel of 88 per cent acid. This treatment did not pass the doctor test. However, the addition of only 0.2 per cent formaldehyde reduced sulfur content to produce a doctor sweet product. Rerunning to remove heavy sulfur condensation maximizes sulfur removal.

INDUSTRY AFFAIRS

Prices Climbing

Phenomenal prices now being paid for oil and gas rights reflect high cost of development, competition for finds

Kenneth B. Barnes

TULSA.—The old days of low field prices for natural gas are gone. And the possibilities of cheap acquisition of oil rights similarly are a thing of the past.

Four current examples—two natural gas and two crude oil—clearly reflect that high prices are here now in a big way. They are:

... Sale by Delhi Oil Corp. of 106,000 acres of leases in the San Juan basin, New Mexico, natural-gas area to El Paso Natural Gas Co.

... Offer by Humble Oil & Refining Co. to sell a maximum of 150,000,000 cu. ft. of natural gas daily to a proposed new big-inch pipe-line project at field prices starting at 15 cents per thousand cubic feet and scaling upwards to 18 cents during the fourth 5-year term.

... Recent sale at Chicago of some of the choice oil royalties of the Warren Wright estate at payout terms running up to nearly 10 years, based on current income.

... Sale of 13/16 of the mineral rights under one undeveloped section of land in Andrews County, West Texas, by John E. Mabee, Tulsa, to The Texas Co. for $1,000,000.

The scale of these prices is on indicated new high ground and at levels far higher than a few years ago. They reflect clearly the accelerated climb of costs of proving up natural gas and oil reserves, the scarcity of new finds, and the intense competition existing in these fields.

Costly exploration.—Just a few years ago field prices for natural gas in the Southwest ranged generally from 4 to 8 cents. These were paid for gas in territories fairly accessible to pipeline purchasers. Some gas, due to location in isolated areas or difficulty encountered in gathering, was offered at even lower prices.

Later on, substantial reserves dedicated to new big-inch carriers leading out of the Southwest got long-term prices in the 8 to 10-cent bracket, and some did even better.

Big money paid out in the Mabee sale in West Texas and for the Warren Wright royalties again reflect the rising costs that oil companies and other purchasers now have to bear to acquire either leases or income from crude-oil and natural-gas production.

Delhi.—This contract, executed late last month, covers 106,000 acres in the area around Blanco and Largo, N. M., and La Plata, Colo., on the following terms: Delhi will receive $80,000 for each present Mesaverde gas well and $20,000 for each shallow gas well. El Paso agreed to develop the acreage to the Mesaverde gas reserve within 5 years, keeping a minimum of six drilling rigs active until the entire properties are developed on 320-acre well spacing.

Delhi reserved an overriding royalty per thousand cubic feet of gas to the well heads on this basis: 5½ cents per thousand during the first 3½ year. from March 1, 1952; 6½ cents during next 3½ years; 7½ cents for next 3½ years; not less than 8 cents during eleventh year; not less than 9 cents during twelfth year; not less than 10 cents after twelfth year.

El Paso has agreed to take or pay for the greater of the following amounts: (a) 25 per cent of the total open-flow capacity on the basis of an 80 per cent load factor up to 150,000,000 cu. ft. daily or (b) 100,000,000 cu. ft. daily until such time as the leases are fully developed, after which (a) would apply.

Delhi also reserved all oil which may be produced from the leases, and an overriding one-third royalty of all liquid hydrocarbons which may be extracted from the gas.

Under the terms of the contract as announced by Delhi's president, C. W. Murchison, El Paso will drill the additional wells, construct the gathering system and gasoline absorption plant, and operate all facilities free of expense to Delhi. The contract is conditioned on El Paso securing government approval to construct additional facilities to transport and market the minimum quantities to be taken under the contract.

Humble offer.—The proposal by Humble involves sale of a maximum of 150,000,000 cu. ft. of natural gas daily for a big-inch line from the Southwest to markets in Ontario contemplated by Pacific Northwest Pipe Line Corp.

Field prices reportedly would start at 15 cents per thousand cubic feet for the first 5-year period, 16 cents for the second, 17 cents for the third, and 18 cents for the fourth 5 years. The offer is reported open for 120 days.

Amount of the reserves offered has not been announced, although the company is believed to have uncommitted reserves of gas estimated at 10 to 12 trillion cubic feet.

Wright royalties.—The recent sale in

Chicago of the first of three groups of oil royalties covered some of the choicest properties made available in several years. From the estate of Warren Wright, three groups of royalties were sold by the First National Bank of Chicago's trust department through submission of sealed bids to William J. Sherry, agent.

Details of the first sale, important as "yardsticks" of current going prices in the field of oil production and reserves, follow:

Interests in the first sale represented 43.8 royalty acres under 13 wells on three leases in Midway pool, Lafayette County, Arkansas (Smackover lime, 6,400 ft.). Midway pool is the pioneer deep pressure-maintenance water-injection operation in the United States and is considered an outstanding example of advanced petroleum engineering and efficient production. The group was sold to Chase National Bank's trust department, New York, for $135,000. The royalty income averaged $1,334 per month during 1951. The sale price represents a payout, on present income before taxes and interest charges, of 8.4 years.

The second group consisted of four royalty interests in the Cranfield Unit Operation and Area, Adams County, Mississippi, which in 1951 produced an average oil and gas revenue of $1,618 per month, plus two interests in Heidelberg pool, Jasper County, Mississippi, which averaged $451 per month.

Successful bidder was A. B. Culberson, Fort Worth, at $237,605. With recent total revenue averaging $2,069 per month, this price represents a payout of 9.5 years before taxes or interest charges.

The third group was composed of about 12 oil-royalty properties. Three parcels in Lake St. John field, one in South Jennings, and one in South Oakville (all Louisiana) averaged about $1,800 per month in 1951. Four units located in the deep Weeks Island field, Iberia Parish, Louisiana, operated by Shell Oil Co., averaged about $8,500 per month recently.

Successful bidder was Humble Oil & Refining Co., Houston, acting as trustee for Humble's Employes' Pension fund. At sale price of $1,164,536, the property would pay out in about 9.4 years, based on recent income figures.

Additional groups of Wright royalties will be opened to sealed bids at Chicago until February 14.

Mabee deal.—John E. Mabee, Tulsa, recently completed sale of 13/16ths of mineral rights under one section of his Andrews County, Texas, ranch to The Texas Co. for $1,000,000. Properties were in Section 32, Block 39, Township 3n, G&MMG&A Survey, a part of Mabee's 106-section ranch in southeastern Andrews County, 15 miles north of Midland.

The acreage is undeveloped but near production. "We had three major companies knocking at our door for the property," the rancher said.

Mabee purchased the 106-section ranch in 1933 in the middle of the depression for less than $1,000,000. He has retained surface rights on the entire ranch, but has sold leases on all but 68 sections. These leases were the ones he sold to Texaco several years ago, which then developed Mabee oil field on the acreage.

Petrochem Progress

Close coordination between petroleum, chemicals supports both industries, C.C.D.A. hears; petrochem growth rapid

George Weber

PHILADELPHIA. — The increasing interrelation between petroleum and chemicals tends mutually to support progress in both of these two pace-setting industries. Each is a customer of the other and the rapid development of new raw materials and finished products exchanged between the two underscores the need for closer coordination.

These conclusions were reached at a recent forum conducted here by the Commercial Chemical Development Association, at which four oil-company representatives explored the exchange of products between petroleum and chemical companies. The fastest-growing branch of chemical development today is in petrochemicals, for which the oil industry provides all basic hydrocarbon stocks. In turn, the oil industry purchases some 1,000 different chemicals to aid in the discovery, drilling, production, transportation, and refining of oil.

L. M. Roberts, manager of manufacturing operations, Shell Chemical Corp., discussed chemicals used in making petrochemicals. A quarter-century ago, only 1 per cent of the 1 billion pounds of aliphatic chemicals produced annually in this country were synthesized from petroleum, he said. Today, national aliphatics production has reached 16 billion pounds annually and at least 75 per cent stems from petroleum.

In 1951, chemical manufacture consumed 750 million gallons of liquid hydrocarbons plus 331 million gallons used in the allied field of synthetic-rubber manufacture. These liquid stocks, plus substantial volumes of natural gas also converted to petrochemicals, represented less than 1 per cent of total production of the oil and gas industries.

TABLE 1—ANNUAL CHEMICAL DEMAND
(Millions of pounds)

Sulfuric acid	3,000
Chlorine	2,000
Hydrofluoric acid	100
Hydrochloric acid	100
Bromine	108
Acetic acid	85
Lime	1,130
Caustic soda	525

TABLE 2—SOLVENT REFINING REQUIREMENTS
(Pounds per year)

Furfural	9,200,000
Propane	26,080,000
Phenol	12,150,000
Cresol	4,780,000
Chlorex	1,320,000
Nitrobenzene	330,000
Ethylene dichloride	68,500
Methyl ethyl ketone	7,200,000
Benzene	3,176,300
Toluene	6,100,000
Aluminum chloride	83,000
Liquid SO_2	5,000,000

Other chemicals.—In addition to these hydrocarbons, the petrochemical industry purchases four other chemicals in large volumes: Sulfuric acid, chlorine, lime, and caustic soda. Roberts noted several factors in evidence in the highly competitive economic situation within the petrochemical industry which portends a decreasing reliance on heavy chemicals, particularly sulfuric acid and chlorine.

His estimates of annual demands of major chemical requirements of the petrochemical industry are shown in Table 1.

Roberts noted that due to expanding facilities for regeneration and reuse of sulfuric acid, probably half of the figure in Table 1 is net intake. Similarly, some of the 2,000 million pounds of chlorine used per year is subsequently recovered as hydrochloric acid and reused.

Chemicals in refining.—D. T. Shaw of Atlantic Refining Co.'s Philadelphia refinery, outlined the uses of chemicals in refining. Listing the chemicals used in treating and other processing, he added, in the form of suggestions, some of the needs of refiners for better chemicals. More selective catalysts which would result in better control of conversion processes are needed, he said. Substitutes for acid treating would reduce cost and dependence on a scarce chemical, at the same time cutting alkali consumption. Cheaper substitutes for additives now used for fuel quality improvement were also included among new chemical needs.

Lube manufacture.—A division of refining which consumes many chemicals in major volumes is the manufacture of lubricating oils and greases. This division was treated in a separate paper by Dr. W. E. Kuhn, manager of the technical and research division of The Texas Co. In a thorough study of this field, Dr.

TABLE 3—TONS OF CHEMICALS REQUIRED PER MONTH

	Sulfur (elemental) (not including acid)	Chlorine	Barium (as octahydrate)	Phosphorus (elemental)	Metallic sulfonates (as 100%)	Phenol
1. Motor and heavy-duty lubricating oil additives	438	150	873	152	980	517
2. Gear oil additives	154	684	...	5	...	...
3. Cutting oil additives (sulfur chlorine type)	16	186	...	...	...	...
Total	608	1,020	873	157	980	517

Kuhn supplemented the recent estimates of Petroleum Administration for Defense with further details from his study. *(The Oil and Gas Journal, December 6, 1951, page 76.)*

Dr. Kuhn summarizes solvent refining needs in Table 2. These figures, he pointed out, neglect unscheduled losses and do not take into consideration the proposed expansion of solvent refining capacity by 15,000 bbl. per day.

Of the Petroleum Administration for Defense estimate of sulfuric acid consumption of 49,700 tons last year, between 60 and 75 per cent was used in the processing of lubricating oils, he said. Clay requirements were estimated at about 250,000 tons per year.

In the complex field of additives, he discussed the many compounds which control oxidation and improve physical properties of oils. Inhibitor-detergent additives are being used today by the petroleum industry in estimated amounts of 2,200,000 gal. per month for heavy duty oils and 210,000 gal. per month for premium type oils, at a total estimated cost of $52,560,000 annually. Recent Petroleum Administration for Defense estimates of the consumption of pour depressants, viscosity index improvers, anticorrosive agents, and extreme pressure agents were quoted.

The industry's requirements for major chemicals for 1952 are summarized in Table 3.

It can be conservatively estimated, concluded Dr. Kuhn, that the current chemical requirements for lubricating oils and greases will be well in excess of $100,000,000 per year.

Other activities. — The drilling and production division of the industry was discussed by T. V. Moore of Standard Oil Development Co. Making no estimates of quantities required in the exploration, drilling, and recovery of oil, he concluded that new developments in petroleum producing that will affect the industry's consumption of chemicals will be along two lines. There will be a concerted effort to develop equipment and techniques that will eliminate the need for the more expensive chemicals that are now used, and there will be an equally intensive effort to improve the methods of drilling wells and producing oil, some of which will undoubtedly lead to the introduction of new processes which consume chemicals.

New Petrochem Plant

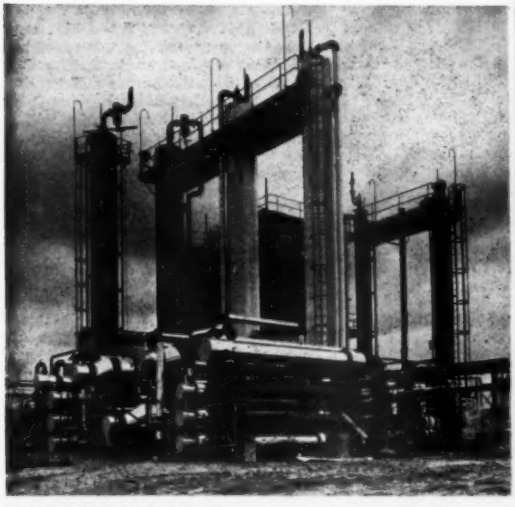
Texas Eastman's Longview facilities turn propane and natural gas into chemicals to be used in making plastics

LONGVIEW, Tex.—Operations have begun at Texas Eastman Co.'s new petrochemical plant near here, which utilizes propane principally for the production of chemicals to be used in the manufacture of plastics and as gasoline additives.

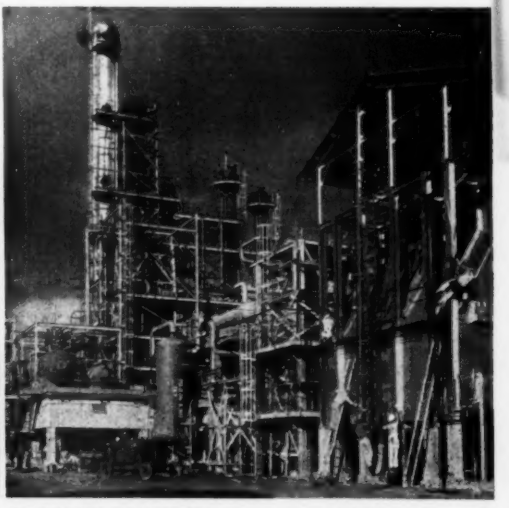
Using the Oxo process, the plant thermally cracks propane to produce acetic acid, acetic anhydride, butyric acid, and butyric anhydride. A major portion of its products will be shipped to the Kingsport, Tenn., plant of Tennessee Eastman Co., which makes "Tenite" plastic. Both Tennessee Eastman and Texas Eastman are subsidiaries of Eastman Kodak Co., Rochester, N. Y.

Built near the center of a horseshoe-shaped lake, the plant was erected around a steam plant and reactor building. Natural gas, carbon dioxide, and steam are brought together and cracked at high temperatures to provide synthesis gas for the Oxo process and hydrogen for subsequent hydrogenation reactions. At the other end of the plant, propane is cracked and propylene and ethylene separated.

Operation.—Propylene and synthesis



SYNTHESIS UNITS.—Natural gas, carbon dioxide, and steam react at high temperatures in these units at Texas Eastman to form synthesis gas.



PROPANE CRACKER.—Furnaces at right crack propane in the Texas Eastman plant. Propylene and ethylene formed are separated in the columns at left.

gas from these two operations are fed under high pressure into catalytic reactors where a mixture of iso and n-butyraldehyde is formed. The aldehyde mixture from the reactors is then separated and refined.

Ethylene from the propane cracking units is sent to the alcohol plant where it is converted directly into ethyl alcohol. The alcohol units, however, will not be ready for operation until April

Production of n-butyraldehyde will be split three ways: A portion will be sold as the aldehyde; a portion shipped to Tennessee Eastman's Kingsport, Tenn., plant where it will be converted to alcohol and acid for use in making cellulose acetate butyrate and "Tenite" plastic; and a portion will be converted into 2-ethyl alcohol for use in manufacturing dioctyl phthalate in Kingsport.

Isobutyraldehyde production will also be split three ways: A part will be made available to the industry as the aldehyde; another part will be converted into alcohol; and a third portion will be converted to the acetate. Tests made in substituting isobutyl alcohol and acetate in lacquer formations currently using the n-butyl solvents show great promise, according to the company.

Ethyl alcohol to be produced by Texas Eastman's plant will be shipped to Kingsport for conversion into acetic acid, acetic anhydride, and solvents such as ethyl acetate and isopropyl acetate.

Included in its line of industrial chemicals, Tennessee Eastman also manufactures Tenamene, a series of gasoline additives, including gum inhibitors for motor and aviation fuels, and a copper deactivator.

Strike Threat

Union policy group meets as talks stay deadlocked

KANSAS CITY, Mo.—A meeting of the policy committee of the Oil Workers International Union here over the weekend pointed to the possibility of a major strike in the petroleum industry.

Representatives of the O.W.I.U.'s eight districts were summoned to the meeting, which began February 1. Principal point of discussion was expected to be the union's plan of action resulting from current deadlocks in strike negotiations.

It was called as two major refineries already were strikebound and labor problems had become acute at a third.

At Bayonne, N. J., an apparent stalemate had been reached in negotiations following the strike which closed the 77,000-bbl. refinery of Tide Water Associated Oil Co. 4 weeks ago.

Last week the company submitted to union leaders a proposed contract which it described as the limit to which the company was willing to go. The offer was not accepted and picketing continues. No further meetings have been scheduled.

Pure plant affected.—Near Beaumont Tex., shutdown operations began January 28 at Pure Oil Co.'s 55,000-bbl. Smiths Bluff refinery.

Here the strike was caused by the walkout at Pure's docks of 10 marine engineers who set up a picket line at the refinery and asked refinery workers to recognize it.

At Sunray, Tex., Shamrock Oil & Gas Corp. refused to reemploy about 200 workers at its 10,000-bbl. refinery who had walked out without union sanction. The unauthorized strike followed discharge of a plant employe after a $50,000 fire at the refinery.

Shamrock said the company was treating the leaving of the 200 men as "permanent termination" since they left of their own accord and accepted final termination pay, including accumulated vacation pay.

Prolific Spraberry Well

MIDLAND, Tex.—An exceptional well for the Spraberry trend, and possibly a record producer, was brought in last week by Sinclair Oil & Gas Co.

The company's 2 J. B. Calverley, a 1¾-mile northeast stepout of Driver field in southwest Glasscock County, was flowing 49½ bbl. per hour after 24 hours through open 2-in. tubing. Gravity was 35° and the gas-oil ratio 980 cu. ft.

The well topped the Spraberry at 2,683 ft. and was bottomed at 6,902 ft. Following fracture treatment, the well gaged more than 1,100 bbl. per day.

Index Ready Soon

The complete editorial index of The Oil and Gas Journal for 1951 is now in preparation and will soon be ready. The complete index, enlarged and improved and with more cross-references, bound separately, will be sent to you without charge upon request. Address your request to Circulation Department, P. O. Box 1260, Tulsa.

Industry Briefs

LANSING, Mich.—A proposed boost in the Michigan severance tax on oil and gas production is now under consideration of the general-taxation committee of the house of representatives. The house bill, which was referred to the committee, calls for a general increase from 2 to 3 per cent, with revenue to be divided between the state general fund and the road funds of the producing counties.

AUSTIN, Tex. — The Texas Railroad Commission will conduct a hearing March 11 on the application of The Texas Co. to inject gas into the Canyon reef in the Cogdell area of Scurry and Kent counties. The company has asked for transfer of allowables on some leases and exceptions to the gas-oil ratio rule in its pressure-maintenance program.

OKLAHOMA CITY. — The Oklahoma Supreme Court ruled last week that gross-production taxes totaling $1,500,000 should not be returned to The Texas Co. and Magnolia Petroleum Co. The money was paid under protest by the firms and had been held aside awaiting a final ruling. The companies had maintained the taxes were on oil taken from Indian land and that since the Government was holding the land in trust for the Indians, to tax the oil would be, in effect, to tax the Government. The tax was levied in 1942.

HOUSTON.—Humble Oil & Refining Co. is planning to begin construction next month on a three-story research center here. The building's 112,000 sq. ft. of floor space will be allocated to the company's geophysics and geologic-research sections, its production - research division, petroleum - engineering laboratories, and shops for manufacturing research equipment.

OKLAHOMA CITY. — Oklahoma's February crude-oil-production allowable was set last week by the Corporation Commission at 515,000 bbl. daily, same as December and 250 bbl. daily under January. Bureau of Mines forecast of market demand was 531,000 bbl. per day. Purchasers' nominations totaled 565,206 bbl. daily.

TYLER, Tex. — Warren Petroleum Corp. plans to begin drilling soon on an underground salt-dome storage project for L.P.G. near here. The reservoir, to be washed out of a piercement-type salt dome 2 miles east of here, will have a capacity between 100,000 and 200,000 bbl. Warren will inject L.P.G. received from several natural-gasoline plants in the area.

HOUSTON.—Tennessee Production Co., subsidiary of Tennessee Gas Transmission Co., of Houston, has purchased the outstanding stock of York & Harper, Inc., independent operators of Midland, Tex. Properties of York & Harper are located in West Texas and New Mexico. Consideration was not disclosed.

REFINERY CONTRIBUTION.—Worn-out valves, scrap pipe, and discarded fly wheels made ideal scrap for steel mills.

Oil's Scrap Outlook

Collection is routine with most companies, but PAD feels a lot more could be rounded up with a little extra effort

Ted Armstrong

THERE isn't as much oil-field scrap as the steel industry would like, but there may be more than the oil industry realizes.

Major oil companies are proud of their scrap policy. They collect it continually and sell it as it accumulates. The independents have their programs, too, although not so well organized.

Nearly all companies agree on one point—an all-out scrap drive would not produce as much scrap steel as the Petroleum Administration for Defense and the steel companies think.

But there are indications that many of the companies have not yet explored the scrap possibilities of "stagnant" or idle equipment.

How badly needed?—The steel mills' need for scrap is critical and has been growing more desperate with the passing months.

Steel companies now are running ads in trade magazines asking for scrap. Their salesmen have been armed with handbooks on scrap collection and forged into an army of scrap solicitors. Washington officials admittedly are disturbed over the shortage.

Scrap's importance lies in the fact that open-hearth furnaces take approximately 50 per cent pig iron and 50 per cent scrap. Electric furnaces take almost nothing but scrap.

Normally mills keep stocks sufficient for 60 to 70 days' operation, but present inventories are 15 to 20 days and in many cases less.

In Houston, for example, an executive of Sheffield Steel Co. said: "For some weeks now we have been keeping our heads above water with difficulty. The situation is the same throughout the steel industry."

PAD's view.—Bruce K. Brown, deputy petroleum administrator, sums up the urgency of scrap collection in a simple formula: "No scrap, no steel; no steel, no oil or gas."

"Speak of scrap and the drive to get it into the steel mills," Brown told The Oil and Gas Journal, "and you strike something of a dead spot with too many in the oil and gas industry. Over the years, this industry has never been a large supplier of scrap. Many see no reason for trying to change the situation now.

"But there is a reason, and a big one. Steel is in extremely tight supply and scrap is absolutely essential to the production of steel."

Last year, Brown said, the steel industry had to get 36,000,000 tons of scrap from outside sources to supplement its own scrap recovery. With a substantial increase in steel output scheduled for 1952, scrap requirements this year will be far in excess of those of 1951 and the effort to collect scrap must be intensified.

"To some oil or gas operators that sort of appeal will suggest only that they have a maintenance crew walk around the premises and pick up things that are obviously junk—a few lengths of pipe alongside some rig, rusted beyond recovery, or a few bits of used plate in a refinery yard.

"If this is all that is recovered by the industry and sold to the scrap dealers, the contribution of the industry will be negligible."

Company views.—Most of the major companies, however, insist there isn't a great deal of scrap to be found. Typical report is this comment from a Tulsa-headquartered firm.

"We have a minimum of scrap. We pick it up regularly and sell it. A concentrated drive now probably would turn up some additional metal by focusing attention on the problem, but in the long run it would't make for much extra steel as far as we are concerned."

This company and most other majors said their policy is to pick up scrap as a routine matter and haul it to collection yards. Here it is sorted as men are available, with reusable material salvaged and the rest sold to junk dealers. Some are now requiring bills of lading from the junk dealers to assure themselves that the scrap is being sent direct to a steel mill and not resold locally for other purposes.

Reasons for their collection policy, the majors say, fall in this order:

. . . Good housekeeping.—Nearly all insist on clean-appearing leases and plants, whether for public relations, employe morale, or safety reasons.

. . . Economics.—At present prices up to $28 per ton for unprepared and $37 for prepared scrap it's only good business to move the metal. Also, the scrap makes steel and all companies need steel.

. . . Defense program.—The scrap is needed, and the companies want to make sure they are doing at least what is expected of them in the rearmament program.

With most of the small companies, the economic angle is foremost. Scrap is collected and sold, but less fre-

FIELD CONTRIBUTION.—Cut-off drill-pipe collars help charge furnaces of steel mills. Inspection for inside cracks determines whether pipe will be reused or junked.

quently and more on a when-we-can-get-to-it basis.

One, for example, said it has no regular cleanup program, but rounds up scrap whenever a sizable quantity accumulates. It started a drive last July following the early publicity on scrap needs, the first such drive in a year and a half. Another drive the first of this year resulted in the shipping of 77 tons.

Another small Mid-Continent producing company cleaned out its yards and leases in December. "We have a a policy of collecting, sorting, and shipping every 6 months," the president said.

Overlooked source?—Sun Oil Co.'s successful campaign over several months has pointed toward marginal equipment as a major possibility in the nationwide scrap hunt.

Sun began its drive in late June at the request of the American Iron and Steel Institute, which wanted the company to act as a guinea pig to see just how much scrap might be collected.

By August 10 the company had sold 2,000 tons; at the beginning of this year more than 8,000 tons had been turned in. The program is continuing.

Most of the scrap, Sun says, came from obsolete refinery units and equipment. Relatively little was "ordinary scrap" of the type accumulated in day-to-day operations.

One important lesson taught by the drive, Sun says, is that a well-planned drive will pay for itself in dollars and cents and will yield extra dividends in greater safety, improved working conditions, and in the discovery of usable material.

As an example, Sun spent $91,000 for its scrap campaign in its Marcus Hook refinery. The drive turned up 6,800,000 lb. of metal which brought $86,000. While the figures would indicate a loss, Sun said the campaign also resulted in salvaging and returning to warehouse stocks 93 tons of steel pipe from 4 to 10 in. in diameter, 71 tons of steel tank plate, 64 tons of structural steel shapes, and 111,000 board feet of lumber.

Current activity.—Since the start on the Sun campaign and in response to repeated appeals, mostly from Petroleum Administration for Defense, companies are stepping up their scrap programs and many are taking a new look at their standby or marginal equipment.

Cities Service Oil Co., for example, got an early start last year, scrapped its Braintree refinery and held successful drives in its Linden and Pettys Island, N. J., refineries.

Shell Oil Co. has stepped up its program, asking each district to appoint an individual to push collection of obvious scrap and, in addition, to recommend for management approval the scrapping of marginal facilities.

Carter Oil Co. has asked its superintendents to take a new look at facilities of a marginal nature to see what in-place equipment might be junked.

Socony-Vacuum Oil Co., Inc., has directed all its refineries to develop extraordinary scrap searches. Tide Water Associated Oil Co. has sent executive letters to its various divisions urging extra efforts and enclosing copies of a letter from Bruce Brown asking that the scrap search be intensified.

Esso Standard Oil Co. reports it is conducting weekly scrap cleanups in its refineries. Many other companies are now approaching the scrap problem along similar lines.

Novel approach—One hitch in the campaign to get all possible scrap has been the reluctance of many operators to scrap a machine, tank, or process unit which might be reused.

To encourage operators to either sell or scrap their idle equipment, Joseph T. Ryerson & Son, Inc., large steel distributor, has offered free classified-advertising space to help owners sell it.

Ryerson, with a pictorial-type newspaper with a national circulation of more than 100,000, has written customers offering them space in which to advertise their unused facilities to other possible users. The implied suggestion is, of course: "If you can't sell it, scrap it."

CANADA

Saskatchewan Strike Gaged

REGINA, Sask.—Latest tests of Saskatchewan's first commercial medium-oil producer indicate a final production rate of about 300 bbl. daily.

The discovery well is Socony-Western Prairie 1 Roseray, LSD 2, 10-17-18w3, near Fosterton in the southwestern portion of the province. Production rating was based on a 4-hour test through ¼-in. choke.

Gravity of the oil was set at 24.4°, and gas-oil ratio was 17:1. Shut-in casing pressure was 120 psi., and shut-in tubing pressure was checked at 110 psi.

On the basis of the tests, 1 Roseray appears to be the biggest producer in the province. Producing formation is believed to be the Blairmore (Lower Cretaceous), which has been proved for a thickness of 61 ft. from 3,065 to 3,126 ft.

The well was drilled by Socony-Vacuum Exploration Co. on a 591,000-acre farmout from Western Prairie Exploration Co. *(The Oil and Gas Journal, January 21, 1952, page 54).* Socony is reported here as already surveying for stepout locations.

Gas-Export Rule Delayed

EDMONTON, Alta.—The Alberta Petroleum and Natural Gas Conservation Board is not expected to reach a decision before March 20 on six applications for permission to export natural gas from the province, government officials here report.

The board decided last year that Alberta's gas needs for the next 30 years were too nearly equal to reserves then proved to permit export at that time. It has held public hearings on export applications since then, and development of gas reserves has been accelerated.

Goal for U. S. Oil

PAD wants 80,000 wells, more refining capacity and pipe lines in U. S. to serve as "cushion" against emergencies

WASHINGTON.—A sharply stepped-up program to put the oil industry world-wide in a position of comfortable capacity to meet current demand, with some reserve of production, refinery, and other facilities to meet an emergency, has been submitted to the Defense Production Administration for approval by the Petroleum Administration for Defense.

The program, designed to increase crude producibility by 1,509,000 bbl. daily, with allowance for depletion, by the end of 1953, should provide some "cushion" against emergency demands, it was explained by Deputy Administrator Bruce K. Brown, although he said it probably would not be as great as existed at the outbreak of the Korean conflict.

The whole pattern of expansion laid before the DPA, Brown emphasized, covers what it was found by company-by-company inquiry that the oil industry was ready and financially able to do of its own initiative with no incentives from the government beyond accelerated amortization and other benefits of the Defense Production Act. This is provided there is no repressive influence set up by increased taxes, or reduction of the depletion allowance.

Brown said the program represents PAD's estimates of forward demand and availability of products, taking account of refining capacity, availability of crude, and imports.

Secret studies made.—Secret studies of supply and demand in the event of a major war showed that shortages would be inevitable, he said, and estimates of the materials required to protect the United States under any circumstances showed they would be so great as to make consideration of such an effort impossible.

Following the survey of company willingness to go ahead with expansion projects, PAD set up a "bill of materials" for the steel, copper, and aluminum necessary if this construction was to go ahead, and submitted the whole project to the DPA.

The plan covers oil only—no natural-gas production or transmission projects are included.

What it calls for.—It contemplates that between July 1, 1952, and December 31, 1953, there shall be 80,000 wells drilled in the United States—25,000 of them in the last 6 months of this year—of which 60,000 would be development wells, 19,200 exploratory and 800 injection wells. This drilling would increase producibility of 642,000 bbl. daily by the end of 18 months.

A total of 10,128 wells would be drilled abroad, 4,020 of them in Canada, to increase producibility by the end of 1953 by 867,000 bbl. daily. Of the 6,108 wells drilled abroad other than in Canada, 5,250 would be development and 858 exploratory. Eighty-two per cent of the development wells and 69 per cent of the exploratory wells would be in the Western Hemisphere other than the United States and Canada.

The plan also calls for increasing the United States refinery capacity at an annual rate of 475,000 bbl. daily and foreign refinery capacity at a rate of 348,000 bbl. daily.

It provides for the construction of 19,700 miles in the United States and 3,800 miles abroad of crude and products pipe lines, and tankage for storage of 153,000,000 bbl. in the United States and 35,000,000 bbl. abroad.

On the basis of a year's experience with the Controlled-Materials plan, PAD estimated that to carry out this new program would require an increase in the availability of steel of 45.9 per cent above present rates for the United States, 46.2 per cent for Canada, and 36.3 per cent for foreign operations. The figure on foreign operations represents only the demand on the United States for material and does not include what the companies would secure abroad.

Refining.—The refinery program originally set up by PAD called for expansion at the rate of 333,000 bbl. daily per annum over a period of 3 years, but the industry thus far has not been able to approach that figure because of shortages of materials. The 1951 increase in capacity is tentatively estimated at about 250,000 bbl. daily in new facilities and, at material allocation rates of the first half of 1952, the addition this year is expected to be in the neighborhood of 320,000 bbl. daily.

This program has long since been conceded to be inadequate to meet the steadily increased demand foreseen in the future, but it has been about the best that could be done in view of present material supplies.

As an indication of the need for a world-wide expansion program, Brown pointed out that the next 6 months will see a shortage of residual of 150,000 bbl. daily.

Peculiarly enough, one cause of this shortage will be the large number of oil-burning colliers brought out of mothballs to handle a heavy increase in coal exports to Europe.

Steel Allocations

PAD sets up new system for obtaining tubular goods

WASHINGTON.—A new system of tubular-goods allocation has been set up by the Petroleum Administration for Defense to encourage the use of conversion steel by oil and gas operators.

Under the new plan, operators will be able to get allotments of tubular goods made from conversion steel entirely separate from their regular allotments.

PAD officials admitted frankly that the plan tried out for the current quarter had proven unsatisfactory and the change was made to correct the situation. Conversion steel came under PAD allocation for the first time this quarter and the procedure set up provided that when an operator got an allotment of conversion steel it was to be subtracted from his total allotment for the succeeding quarter.

As a result, Deputy Administrator Bruce K. Brown said, it proved difficult to get operators to take conversion pipe as part of their regular allotment and there was danger that some mill space available for conversion work would go unused.

How it works.—Under the new system, allotments of conversion steel will no longer be subtracted from an operator's total allotment for the next quarter. Instead, when that next allotment is made, conversion allotments will be considered as if they were normal allotments when determination is made of the tonnage which the operator is entitled to on the basis of his drilling history.

Result.—The next result will be that if an operator uses the more expensive conversion casing and tubing to increase his drilling program, he will be entitled to a larger normal allotment of steel in the subsequent quarter than if he had not used conversion steel.

Provision is made to insure that conversion pipe is used as acquired and not stocked. Such pipe not used will be counted as part of the operator's inventory when figuring subsequent allocations.

Any operator, whether or not he has received an allotment for tubular goods from regular mill production, may file for such goods from

conversion steel. Application will be made on Form PAD-17, the regular form for priorities assistance. Four copies of the form must be submitted, marked "Conversion," and applications must be filed within 2 weeks after receipt of the regular allotment.

The new system will go into effect with second-quarter allotments, and applications will be processed by PAD in accordance with its standard for regular allotments.

The procedure in no way will bar an operator from making application for a secondary allotment of tubular goods from regular production, and requests for conversion and secondary allotments will be considered separately.

Brown explained that PAD is making every effort to increase normal mill production and so reduce the need for using conversion steel, but there is still some mill space that must work on conversion steel if it is to be used at all.

It is estimated that in the second quarter there will be available to domestic operators some 25,000 tons of conversion production in addition to normal mill output of 425,000 tons. This conversion production, Brown said, must be used if the drilling program is to stay on schedule.

Sulfur Shortage Estimated

WASHINGTON.—World production of sulfur this year will fall short of meeting requirements of 7,364,100 tons by about 1,539,000 tons, the International Materials Conference estimates.

The deficiency will be the largest experienced since requirements overtook production at the end of World War II.

Consumption in 1951 is estimated to have been 6,179,900 tons, compared with an estimated output of 5,823,600 tons. Actual consumption in 1950 was 6,128,300 tons as against production of 5,722,000 tons.

Shortages in 1950-51 were made up by reductions in stocks, especially in the United States and Italy, but no further substantial reductions can be expected this year; therefore consumption will have to be curtailed to fit supplies, the conference's sulfur committee declared. Sixteen governments are represented on the committee, which allocates crude sulfur among the consuming countries.

The committee figures indicated that United States and Canadian availability of sulfur during the first 6 months of this year will amount to 2,691,000 tons compared with 2,638,500 tons during the last 6 months of 1951.

Under the international allocation schedule the United States and Canada will be given a consumption quota of 2,226,000 tons against 2,148,500 tons for the last 6 months of 1951, and the United States will be asked to export 465,000 tons compared with 490,000 tons.

WATCHING WASHINGTON

Bertram F. Linz

Heating-Oil Tangle

In the face of a marked lack of success in its effort to solve the East Coast heating-oil situation by the raising of price ceilings, the Petroleum Administration for Defense is pushing a recommendation that the Office of Price Stabilization either raise the present $2.10 per barrel ceiling on Navy special fuel oil to $2.17 or remove ceilings altogether.

Because of the low price at which the Navy must buy its fuel, suppliers are reluctant to bid on contracts since they can sell the distillate and heavy fuel oil which make Navy special separately at better figures.

Last year, PAD issued a directive to the companies instructing them to furnish Navy requirements with the price to be as agreed upon by the companies, the Armed Services Petroleum Purchasing Agency, and the OPS.

Directives are again under consideration, but PAD is reluctant to issue them because the price no longer is subject to agreement.

Needling Irks

Deputy Petroleum Administrator Bruce K. Brown is getting a little irked over the needling he gets from newspaper columnists and magazine writers about the warnings he and his associates in PAD have voiced from time to time about the possibilities of oil-supply difficulties.

To these writers, Brown has been crying about possibilities that never developed but they have failed to realize that PAD has not only been pointing out potential dangers but actually doing something about them and so successfully, in fact, that so far no serious situations have developed.

A major demonstration of PAD's policy of chasing troubles before they occur was the warning it issued last summer that the closing down of the Abadan refinery might create world-wide difficulties, and the intercompany agreement it then pushed through which met the situation before it reached serious proportions.

Another demonstration was the tanker agreement it secured a year ago to insure adequate transportation for Navy requirements. More recently, PAD attempted to head off the possibility of heating-oil shortages in New England but so far, and for the first time, hasn't accomplished anything.

What might have happened and didn't is just as important in the oil industry these days as what did happen. So, for the benefit of writers who are skeptical, Brown has issued a little pamphlet—not printed at government expense—recalling the gasoline and fuel-oil shortage of 1947.

In "Some Not-So-Ancient History," Brown sketches what happened in 1947-48, when the oil industry could not get materials enough to keep pace with increasing demand.

New Angle?

The federal Government's effort to limit the definition of inland waters under the Supreme Court decision in the California tidelands case may jeopardize its rights under international law, it is claimed by proponents of state ownership.

The claim is based on a recent judgment of the International Court of Justice in a case brought by the United Kingdom after Norway over a period of years had seized a number of British vessels fishing within what it claimed to be its territorial waters. The court held that Norway was within its rights in basing its territorial limits on a formula contrary to what the Department of Justice contends is required by international law in drawing the line between inland and open waters off the coast of California.

In presenting its argument to the court last year in connection with the delineation of the line in the several areas off California which are in controversy, the department leaned heavily on the British position that Norway's territorial claims were too broad, which was rejected by the court.

Since the territorial sea commences in many places at the outer edge of inland waters, as in the case of bays, it is pointed out that a narrow definition of inland waters bring the open sea close to the shore, thereby giving foreign nations rights in the sea and air closer to the shore than where inland waters, and consequently the territorial sea, are extended out to the maximum distance permitted by international law.

Accordingly, it is contended, the United States should seek to maintain a territorial line in keeping with the court's decision rather than sacrifice the national security to gain possession of California's offshore oil.

Availability Forecast

NPC committee chairman says new energy sources will cut oil demands before lack of prospects decreases supplies

WASHINGTON.—New sources of energy will reduce world demand for oil before supplies of petroleum diminish, the National Petroleum Council was told last week at its first 1952 meeting.

This prediction, in a report by L. F. McCollum as chairman of the committee on oil and gas availability, featured a day-long session starting off with the election of Walter S. Hallanan for his sixth consecutive term as chairman and adoption of a budget of $85,000, an increase of $5,000 over 1951.

In the course of the meeting, the council also received reports on synthetic liquid fuels production costs, oil country tubular goods, underground storage for petroleum and the tank truck census.

Short-term availability. — In his report, McCollum brought up to date figures on the short-term availability of oil and gas reported to the council last July, before the elimination of Iranian oil from the picture.

Current estimates on availability from 1951 through 1955 placed the total productive capacity in foreign areas exclusive of Russian-dominated countries at an average of 5,221,000 bbl. daily for the full year 1951 and in the range from 6,669,000 to 7,427,000 bbl. per day by 1955. The 1955 domestic availability is placed at between 7,789,000 and 8,838,000 bbl. daily.

The final report of the committee covered the long term into the indefinite future, but no figures were included because of the belief they would be dangerous and misleading in the light of experience that such forecasts in the past have always proven to be underestimates.

Major conclusions.—The major conclusions of the report, however, were:

Available supplies of oil and gas will continue to increase rapidly in the near future.

Large quantities of oil and gas remain to be found in the United States and foreign countries.

Techniques for finding and producing oil have improved greatly, are currently being improved, and will continue to improve.

Increasing availability of petroleum can be counted on in the United States and throughout the world, provided reasonable economic incentives and a favorable climate for private investment are maintained.

Energy from other sources at attractive prices may finally bring about a decrease in petroleum demand before any lack of prospects causes a decrease of available supplies.

Competition among fuels is the best way to supply our needs for energy at the lowest cost.

"In short," the report concluded, "the United States and the world can count upon increasing supplies of oil and gas not only for the next few years but for the foreseeable future, provided that reasonable economic incentives, adequate materials, and a favorable climate for private investment prevail."

Steel study. — Finding that neither the Petroleum Administration for Defense nor the steel industry can furnish satisfactory data for a study of the most desirable pattern for the production of oil-country tubular goods, a questionnaire will shortly be sent to petroleum operators asking for the needed information, it was reported by Committee Chairman Russell B. Brown of the Independent Petroleum Association of America.

The questionnaire will ask operators to report the tons and footage actually used, what would have been used in the same wells if available, various sizes of casing and tubing over a selected period, number of wells completed, and total footage drilled.

Transport.—A report on tank-truck operations during the 12 months ended last June 1 by P. C. Spencer, Sinclair Oil Corp., showed that 1,063 for-hire carriers in the United States had 10,613 general-purpose tractor-semitrailer units and 2,875 trains with a total carrying capacity of 73,024,635 gal., plus 506 pressure units with a total water capacity of 2,580,252 gal.

In addition, there were 135 sulfuric acid tanks, 27 muriatic acid tanks, and 9 nitric acid tanks with a total capacity of 567,888 gal., together with 1,381 units with a total capacity of 5,715,283 gal. built for such commodities as hot asphalt, various chemicals, liquid sulfur, rubber latex, glue, and caustic soda.

This total fleet of 15,546 units of all types has an annual movement of 816,872,661 miles in petroleum service only and during the 12 months under review transported 29,784,133,452 gal. of petroleum products.

Private carriers had a total of 9,665 tank trailers and semitrailers in petroleum service as of June 1, 1951, with a total capacity of 47,954,000 gal. The chemical industry had 218 general-purpose units with a total capacity of 392,672 water gallons and 163 units for special products with a total capacity of 362,530 water gallons.

The committee on underground storage submitted a brief progress report and is expected to make a more complete showing at the next council meeting in April.

Synthetics.—Claims by the Bureau of Mines that it could produce gasoline from coal at a cost less than one-third that estimated by NPC were challenged again at the meeting.

W. S. S. Rodgers of The Texas Co., chairman of the synthetics committee, said the bureau arrived at production cost of its proposed 30,000 bbl. per day coal-hydrogenation plant by underestimating the cost of the plant facilities by $47,500,000, not allowing an estimated $55,000,000 for necessary housing, and cutting allowance for working capital, startup expense, and other capital charges by $19,000,000.

The committee said bureau estimates of operating personnel and maintenance labor also were too low. In addition several marketing factors were not taken into account.

In reality, the report asserted, the plant proposed by the bureau cannot be classified as a liquid-fuels venture, because chemicals which would be produced would account for more than half of the total revenue.

New Stockpoints

PAD designates warehouses to dispense tubular goods

WASHINGTON.—Two new stockpoints have been set up and stocks at other points revised by the Petroleum Administration for Defense to bring emergency supplies of casing and tubing closer to areas of greatest wildcat activity.

The over-all set-aside of 5 per cent of the total tonnage of tubular goods available each quarter will not be changed. Currently, the amount reserved for wildcat drilling by operators who normally drill fewer than 40 wells a year is 7,400 tons a month.

The newly designated warehouses from which tubular goods will be distributed are Continental Supply Co., Farmington, N. M., and Lloyd-Smith Supply Co., Bradford, Pa., each to get 50 tons a month.

Stocks increased.—To bring supplies more in line with the level of activity in the various areas, tonnages will be increased at five points: Oklahoma City, from 600 to 650 tons; Houston, 400 to 450 tons; Alice, Tex., 300 to 500 tons; Wichita Falls, Tex., 400 to 600 tons; and Shreveport, La., 500 to 800 tons. In the first three cities, tonnages will be increased at existing emergency stockpiles. In Wichita Falls the increased tonnage will go to National Supply Co., and in Shreveport to Continental Supply.

These increases will be offset by

reductions from 700 to 300 tons at Los Angeles and 900 to 400 tons at Casper, Wyo. Stocks heretofore carried at these points have been found to be larger than needed by operators in those areas, but they will still have all the tonnage needed for their wildcatting activities, PAD said.

No changes will be made in the stocks carried at the other eight points set up by PAD for the distribution of tubular goods to wildcatters.

EASTERN

Oil Shortage Ahead

Eastern Seaboard will run short of distillate, kerosine by 6,000,000 bbl. due to high tanker rates, PAD head says

WASHINGTON. — There will be a shortage of heating oils along the Eastern Seaboard, particularly north of New York, because a 2.09-cents-a-gallon increase in tanker rates from the Gulf Coast during the last half of 1951 took all the profit out of the business.

This was predicted by Deputy Petroleum Administrator Bruce K. Brown, who appeared before the House interstate commerce committee last week as the first congressional oil investigation of the year got under way.

Even with normally severe weather conditions, Brown told the committee, a deficiency of 6,000,000 bbl. of distillate and kerosine is likely to occur before the heating season closes.

Just how to insure additional supplies, the committee found, is a difficult problem.

Brown told the committee of the steps Petroleum Administration for Defense has taken in an effort to meet the situation. Efforts to increase storage capacity last year fell far short of hoped-for results due to lack of materials, and PAD has been concerned with the outlook, particularly in New England, for some months.

The deputy administrator explained that when the outlook became critical at the turn of the year, PAD, over the objections of the Office of Price Stabilization, wired the 12 major suppliers asking, in the event OPS increased the East Coast ceiling prices on distillates by 4/10-cent at Norfolk, 6/10-cent at New York and northward, and 5/10-cent at other points, whether they would produce or acquire distillate fuels up to 10 per cent in excess of their present East Coast commitments. He also asked if they would turn it over under PAD direction to tanker-terminal resellers who would make it available, also under PAD supervision, to buyers who did not have adequate firm purchase commitments.

Increase rejected.—Brown put a deadline of January 25 on OPS action, and on that day the proposal for a price increase was rejected by Stabilization Director Michael V. DiSalle.

As an alternative, OPS suggested that the Government might underwrite the additional transportation cost on the 6,000,000-bbl. deficiency, using funds made available under the Defense Production Act, but Brown told the committee it would be a lengthy job to work out the arrangement and it might not become effective in time to meet New England needs.

Furthermore, Brown said, once a subsidy was instituted for a small part of the movement it would cause further disorganization in the industry. It would be, he explained, a stop-gap measure which took no cognizance of the probability that the same situation would recur on greater scale next winter since, in effect, it would be bailing out cargo buyers who failed to exercise provident judgment.

A second alternative, suggested by members of the committee, would be to roll back tanker ceilings, but Brown warned that such action would merely result in the transfer of vessels to foreign service where they could earn more money. Tanker rates are based on supply and demand, he said, and the increases last year did not violate OPS ceilings.

DiSalle, and Assistant OPS Director Edward F. Phelps, told the committee an increase in price ceilings which would apply to some 30,000,000 bbl. in storage on the East Coast as well as to future receipts, would cost consumers $14,000,000 to $15,000,000 through the remainder of the current heating season, an average of $3 to $4 per householder.

Phelps pointed out that the season requirements are some 265,000,000 bbl. The expected shortage would be 6,000,000 bbl., or about 6 days' supply, both figures being for the remainder of the current heating year.

Some distributors, Phelps said, undoubtedly oversold and if a shortage develops they will be the only ones affected.

"Exorbitant price." — "We believe a half-cent increase which would apply in effect to 60 to 100 million bbl. of heating oil is an exorbitant price to pay for a shortage of 6,000,000 bbl.," Phelps said, and is "not a solution to be desired in terms of the stabilization program."

OPS is concerned over the situation, Phelps emphasizes, and is anxious that no one goes cold, but believes assumption by the Government of the additional transportation cost on oil brought in through the remainder of the season, estimated as costing about $6,000,000, is the cheaper and preferable solution.

Would have improved.—Brown told the committee that on the basis of replies to his telegram to the major suppliers he was convinced that had OPS accepted the plan the situation in New England would have started to improve within 72 hours. Each day that passes before a workable remedy is developed, however, he warned, will make it that much more difficult to get refinery runs adjusted in time to do any good.

Brown explained that PAD has the authority to issue directives for the distribution of oil already in New England. But it does not have the power to direct anyone to purchase heating oils at a Gulf Coast point, then charter a tank ship and transport them 1,910 nautical miles to New York Harbor and there sell the products, he said.

ECONOMICS

Product Exports Drop

WASHINGTON.—Exports of major petroleum products dropped to an average of 190,000 bbl. daily during the week ended January 4 from an average (revised) of 223,700 bbl. daily during the preceding week, according to the weekly report of the Petroleum Administration for Defense.

The PAD figures cover exports of aviation gasoline by all methods of shipment, and motor gasoline, kerosine, distillate, and residual shipped by tanker or barge.

A feature of the week's movement was an upsurge of distillate exports to an average of 80,100 bbl. daily from 46,400 bbl. daily during the week ended December 28.

Exports during the week ended January 4, while under those of the preceding week, topped the average of 164,800 bbl. daily of the week ended December 21 but were well under the 263,500 bbl. daily of the week ended December 14, PAD reported.

WEEKLY EXPORTS OF PETROLEUM PRODUCTS*
(Thousands of barrels daily)

	Jan. 4, 1952	Dec. 28, 1951	Dec. 7, 1951
Avgas	32.4	43.0	52.4
Motor gasoline	27.3	61.8	97.0
Kerosine	0.1	0.9	27.6
Distillate	80.1	46.4	60.4
Residual	50.1	71.6	33.9
Total	190.0	223.7	271.3

*Petroleum Administration for Defense.

NO SCRAP... NO STEEL!

QUALITY
YOUNGSTOWN
SERVICE

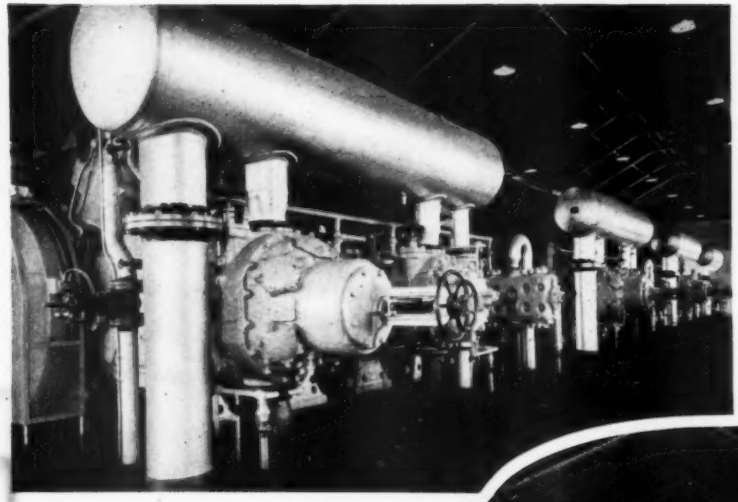
SCRAPPY SAYS:
AID DEFENSE
MORE SCRAP
TODAY...
MORE STEEL
TOMORROW

THE iron and steel industry faces a serious scrap shortage, growing more critical every day. . . . It will be impossible for producers to make the steel tonnages demanded for rearmament and essential civilian needs, unless consumers cooperate by furnishing *more scrap*. . . Most desperately needed now is heavy industrial iron and steel scrap. . . . Keep the cobwebs from gathering at your own plant by turning in more of your own scrap today.

The Youngstown Sheet and Tube Company

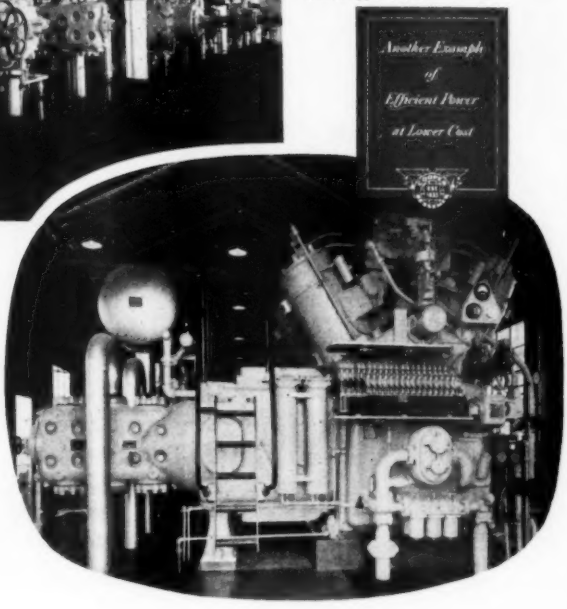
General Offices—Youngstown 1, Ohio
Export Offices—500 Fifth Avenue, New York
MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

The steel industry is using all its resources to produce more steel, but it needs your help and needs it now. Turn in your scrap, through your regular sources, at the earliest possible moment.



Left: All four Cooper-Bessemer GMV-10 compressors in Lolita. North La-Ward, and Maurbro Field Operators' Lolita Compressor Station, operated by Magnolia Petroleum Company... three 1,000 hp GMV's and a 1,350 hp supercharged GMV. Here, casing-head gas is taken from field at 10 psig suction and raised to 1,000 psig discharge for delivery to high pressure absorber in Magnolia's West Ranch Plant.

Below: Close-up of operating end of supercharged, 1,350 hp GMV-10 in above Lolita Compressor Station. Unit provides 35% power increase over former-type units.



Supercharged GMV

. . . a natural for new economy

at the Lolita Compressor Station

MAGNOLIA PETROLEUM COMPANY was one of the first to put a Cooper-Bessemer supercharged GMV into service. And it's shown them a new and sure way to cut costs.

Installed over a year ago in the Lolita Compressor Station, this supercharged GMV and three former-type GMV's are working side by side. All are 10-cylinder units, running at the same speeds and requiring equal space. Yet the supercharged GMV is conservatively rated 1,350 hp—a full 35% gain over the other units.

Think what this offers in cutting over-all installation, piping, operating and maintenance costs! Moreover, there's greater-than-ever economy in lube and fuel consumption.

Cooper-Bessemer V-angles, modern GMX's, GMV's and GMW's, meet all compressor needs from 200 to 3,000 horsepower. They're your best bet for reliability and peak economy.

The
Cooper-Bessemer
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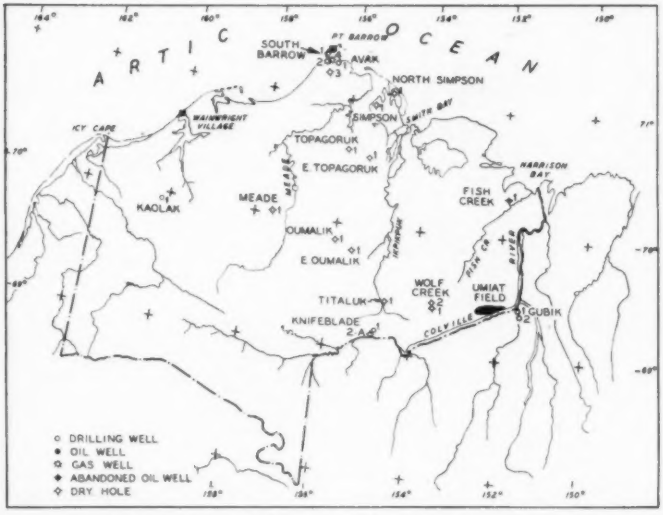
San Francisco, Calif. Houston, Dallas, Greggton, Pampa and
Odessa, Texas Seattle, Wash. Tulsa, Okla. Shreveport, La.
St. Louis, Mo. Los Angeles, Calif. Chicago, Illinois Caracas, Venezuela



WHERE THEY DRILLED.—This map of Petroleum Reserve 4 shows all test wells drilled to date. Core holes are not shown. Oil was found in Umiat field, lower right corner of the reserve; in the Fish Creek well, near Harrison Bay; and in two core holes in the Simpson area, near Smith Bay.

Northern Oil Search

Navy's 8-year program has found one oil field, flowing production in second area; gas prospects considered good

THE future of the Navy's exploration program in Alaska rests with Congress.

If Congress votes appropriations, the Navy will continue its exploration program in Petroleum Reserve No. 4, a 37,000-sq. mile area surrounding the northernmost tip of Alaska.

For 8 years the search for oil has gone on above the Arctic circle. To date, the Navy has discovered one oil field, found noncommercial quantities of oil in another wildcat test, and has drilled two core holes in a third area which found one. It claims five gas discoveries and points to the existence of many other good drilling prospects.

Its present job, the Navy says, is not to develop its finds but to continue its exploration program until a reasonable evaluation of the oil-bearing prospects of the area can be determined.

Oil discoveries.—Umiat field is the only oil reservoir of promise so far discovered in the reserve.

Nine wells have been completed, including three oil producers, one gas producer, and five dry holes. Estimates of recoverable oil range from 30,000,000 to 100,000,000 bbl. Pour point of the crude is —15° F.

Production in Umiat is from sands both within and below the permafrost. The producing formations are sandstones and siltstones of low porosity and permeability.

Oil was found also in the Simpson area, where flowing production was obtained from two shallow core holes. Simpson Core Hole 26 on a short test indicated production of 68 bbl. per day of 21°-gravity oil from between 289 and 325 ft. Core Hole 31 in the same area had an indicated production on a brief test of 200 bbl. per day from the interval between 351-355 ft.

The Simpson area, however, is considered of doubtful value. Reserves are estimated to be less than 20,000,000 bbl., and the nature of the crude would require either heating or visbreaking to permit its movement by pipe line in cold weather.

In addition to these discoveries, some production was obtained from the Fish Creek well, in the extreme northeast corner of the reserve. This well was drilled near an oil seep and is located on the culmination of a large gravity anomaly.

The reconnaissance reflection seismograph did not show any reversal or closure of interest. Sands in the hole from 2,915 to 3,015 ft. produced on the pump about 10 bbl. per day of black 14.9°-gravity oil with a pour point of 25° F. The well was plugged and abandoned.

All oil discoveries and the largest gas discovery, Gubik 2, have been in the Cretaceous. The most favorable sands yet found were cored in Gubik 1, just east of Umiat field outside the reserve. Porosities here ranged as high as 20 per cent and permeability was as high as 570 md.

Gas discoveries.—Five gas wells have been brought in, ranging in estimated production from 823 to 8,000 M.c.f. per day.

Of the five, one is now being used to supply natural gas to the camp at Point Barrow.

Gubik 1 and 2, the most prolific of the gas producers, are situated on an anticline which extends from the reserve across its eastern boundary into the adjacent lands.

Prospects.—Gas reservoirs are believed to exist in the reserve in a large number, in the opinion of the reserve's operating committee, a group which acts in an advisory capacity to the Secretary of the Navy on plans and policies with respect to the reserve.

It is believed that conditions similar to those of the Rocky Mountain and Canadian areas, where there is a preponderance of natural-gas production, may exist also in the reserve.

The committee also believes there are many untested prospects in the reserve. In addition to known structures in the Cretaceous, the Lisburne limestone, which outcrops several hundred feet in thickness in the Brooks Range, is considered to offer inviting prospects as a reservoir rock. So far, this formation has not been reached with the drill.

Background.—Petroleum Reserve No. 4 was created by an executive order of President Harding on February 27, 1923. Not until 1944, however, did the Navy tackle the job of looking for oil.

In addition to the 37,000-sq. mile reserve, the Navy has been looking over another 39,000 sq. miles in northern Alaska east of the reserve. This land was set aside by Public Land Order 82 in 1943 for exploration purposes. Two of the gas discoveries, in fact, Gubik 1 and 2, are outside the reserve in this newly assigned area and are located just southeast of Umiat oil field.

Considerable geologic work has been done on these adjacent lands, and additional seismic work is planned in the area this year.

Surface exploration.—The entire area

PETROLEUM RESERVE NO. 4 TEST WELLS

Well—	Total depth	Oil or gas discovery	Remarks
South Barrow:			
1	3,553	....	Dry hole.
2	2,505	Gas	Hole now filled with mud.
3	2,900	....	Dry hole.
4	2,538	Gas	Supplies Barrow Camp.
North Simpson 1	3,774	....	Dry hole.
Simpson 1	7,002	....	Dry hole.
Topagoruk 1	10,505	....	Dry hole.
East Topagoruk 1	3,589	....	Dry hole.
Fish Creek 1	7,020	Oil	Tested approximately 10 bbl./day 14.9° A.P.I.
Meade 1	5,305	....	Dry hole.
Kaolak 1	6,952	....	Temporarily suspended.
Oumalik 1	11,872	....	Dry hole.
East Oumalik 1	6,035	....	Dry hole.
Gubik:			
1	6,000	Gas	Hole now filled with mud.
2	*4,620	Gas	Well blew out; fire destroyed rig 6 Dec. 1951.
Titaluk 1	4,020	....	Dry hole.
Umiat:			
1	6,005	....	Dry hole.
2	6,212	....	Dry hole.
3	572	Oil	
4	840	....	Dry hole.
5	1,075	Oil	
6	828	....	Dry hole.
7	1,385	....	Dry hole.
8	1,327	Gas	
9	1,257	Oil	
Wolf Creek:			
1	1,500	....	Dry hole.
2	1,618	....	Dry hole.
Knifeblade 2-A	1,805	....	Dry hole.

*Plugged back to 2,260 ft.

GAS WELLS

Well No.—	Producing zone	Est. M.c.f./D.	Choke size	Producing formation	Remarks
S. Barrow 4	2,343-2,502	1,805	24/64	Jurassic basement	Gas being used a Barrow Camp.
Gubik 1	3,418-3,519 3,521-3,608	2,561 823	64/64 48/64	Cretaceous	Hole now filled with mud.
Umiat 8	1,231-1,327	1,497	32/64	Cretaceous	Shut in.
S. Barrow 2	2,282-2,402 2,473-2,504	1,905	30/64	Jurassic basement	Hole now filled with mud.
Gubik 2	1,810-1,855	8,000	32/64	Cretaceous	

FLOWING OIL WELLS

Well No.—	Producing zone	Est. B/D	Grav. oil °A.P.I.	Producing formation	Remarks
Simpson Core Hole 26	289-325	68	21	Cretaceous	Production rate based on very limited test data.
Simpson Core Hole 31	351-355	200	21	Cretaceous	Production rate based on very limited test data.

PUMPING OIL WELLS

Well No.—	Producing zone	Est. B/D	Gravity oil °A.P.I.	Producing formation
Umiat 5	304-344 730-738 770-786 789-835	291	36.3	Cretaceous
Umiat 9	877-966	237	37.2	Cretaceous

north of Brooks Range, which cuts across northern Alaska from east to west, has been covered by aerial photography. All of the petroleum reserve also has been surveyed with the airborne magnetometer.

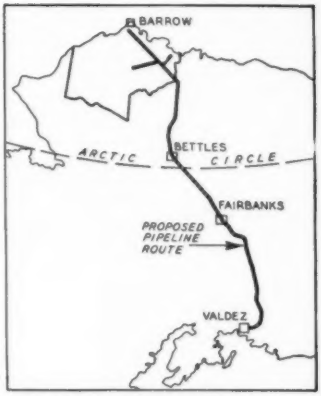
Four geological parties have been in the field almost every year since operations began in 1944, examining surface outcrops along the main rivers. To date 43 anticlines in the Arctic Foothills province between 150° and 162° W. Long. have been identified by the United States Geological Survey.

The first seismograph survey was made in 1946. From 1946 through 1951 an average of three parties each year have been in the field conducting reflection and refraction seismograph surveys.

A substantial portion of the reserve also has been covered by gravimeter, both ground and airborne. This work was carried on from 1945 through 1950.

Geological work is being performed by the Navy Oil Unit of the U. S. Geological Survey.

Over-all conduct of the exploration



PROPOSED LINE.—This map shows the route of the line being given tentative consideration by the Navy for moving oil from Petroleum Reserve 4 to open water, if and when production there should justify it.

program, including drilling, is under contract to Arctic Contractors, a joint company formed by Exploration Contractors, F. F. Lytle Co., and Green Construction Co.

Geophysical work in conjunction with the project is being done by subcontract under the principal contract.

Drilling.—For the most part, drilling sites have been selected on the basis of combined geologic and seismic data.

Drilling has been accomplished with conventional drilling equipment modified where necessary for better performance under local conditions. Drilling rigs used include: Failing 1500, Bucyrus spudder, Cardwell spudder, Cardwell rotary, National 50, National 125, and Wilson Super Titan.

To date, 28 test wells have been drilled in the reserve and three more are now drilling. In addition, 41 core holes have been drilled. Of these, 33 were in the Simpson area, on the north coast southeast of Point Barrow.

The wells now drilling include Umiat 10, with a projected depth of 2,000 ft.; Knifeblade 1, a 1,500-ft. wildcat on the southern border of the reserve; and Avak 1, a 4,000-ft. test in the Point Barrow area.

Projects.—Tentative consideration is being given to the construction of a pipe line from the reserve to an open-water port. *(see map)*. While this would coincide with the development stage, the Navy is studying such a plan to determine what bearing such a line might have on the ultimate value of possible discoveries in northern Alaska.

Extension of the present Alaska road system from Fairbanks north across the Brooks Range to Umiat also is under study by the Alaska Road Commission.

INTERNATIONAL

MIDDLE EAST

Iranian "Peace" Feeler?

Mossadegh's note to Britain raises hopes that deadlock might be broken; Hungary says it will buy Iranian oil

Dahl M. Duff

HOPES for a break in the Iranian oil deadlock rose briefly this week when the Iranian prime minister, Dr. Mossadegh, made what appeared to be a feeler to the British to reopen negotiations.

However, British Government officials in London dismissed Dr. Mossadegh's communication as a possible opening move toward new discussions aimed at settlement of the stalemated oil nationalization, stating that the new Iranian message was little more than an effort to blame Britain in world opinion for the failure of the various negotiations to date. There was nothing to indicate any change of attitude on the part of Dr. Mossadegh which would make negotiations possible, British officials said.

Dr. Mossadegh's message was given to Sir Francis Shepherd, British ambassador to Iran, before he left Teheran for a new post in Warsaw. None of his note was scarcely clear in meaning. However, he did say that he did not know why the British Government "has not settled a question which can be easily resolved by good will, or why differences between the two governments still exist." This seemed to be a curious remark in view of Dr. Mossadegh's violent anti-British statements of the past.

May sell to Hungary. — The Iranian Government announced this week it had reached an agreement to export oil to Hungary. Quantity and price were not specified. The agreement, to be signed later in the week in Teheran and still subject to approval of the parliaments of both countries, was the first definite arrangement for export of oil from the nationalized Anglo-Iranian Oil Co., Ltd., properties. The exports to Hungary will be a barter transaction. The Iranian Government said earlier this month it had received an offer for 500,000 tons of oil from Poland, another Iron Curtain country.

Meanwhile, Iran this week seemed to be moving in the direction of a cheaper price at which it will sell oil. As matters now stand, the Iranian industry is almost completely idle. The Iranian Government has lost its major source of revenue, while the British have been forced to dollar suppliers and into costly emergency expedients to make up the deficit.

In his discussions with representatives of the International Bank for Reconstruction and Development several weeks ago, Dr. Mossadegh indicated the government will insist on the full prevailing price in any long-term arrangement. However, more recently he asked the parliamentary oil commission for authority to sell at lower prices. This appears to be a possibility for spot sales.

Products chances better.—Iran's chances of selling products are considered better than for crude oil. Whatever shortage still exists is in refining capacity for certain products, not crude oil. Residual fuel oil and aviation gasoline are particularly needed in the Eastern Hemisphere. Furthermore, most refiners have long-term crude-supply arrangements which they are not likely to jeopardize by occasional purchases from the nationalized Iranian company.

Even at a drastically reduced price, most sources in the industry do not believe Iran can dispose of any substantial amount of oil. For one reason, the principal marketing outlets are served by the large international companies which are definitely not buying oil from expropriated properties.

Another important factor is the tight tanker market. Few vessels are available to lift oil from Abadan, and these only at extremely high prices. Anglo-Iranian Oil Co., Ltd., also has indicated in widely published advertisements that it will take legal action against any purchaser of Iranian oil.

Suez Plan Offered

A suggestion that the Suez Canal be placed under supervision of the United Nations after the present concession expires in 1968 has been made by the Swedish Shipowners Association.

The future status of the canal was discussed last December by representatives of the shipowners associations of Norway, Denmark, Finland, and Sweden in a conference in Stockholm.

The Swedish organization sent a communication to the Swedish Ministry of Foreign Affairs requesting that it get in touch with other maritime nations to discuss measures which should be taken to solve the problem of the future status of the canal in a manner satisfactory to shipping.

It was agreed that, in the interests of international commerce, it was desirable that the canal be placed under the United Nations with Great Britain as political mandatory power and the canal company as economic administrator.

LATIN AMERICA

Refinery Using T.C.C. Unit

A private corporation, Refinaria E Exploracao de Petroleo Uniao S.A., is constructing a new T.C.C. airlift unit at its Capuavo refinery. The unit, issued under license from Socony-Vacuum Oil Co., Inc., will have a nominal capacity of 25,000 bbl. daily.

The T.C.C. unit will be incorporated into a refinery being built "from the ground up" by Refinaria, an enterprise capitalized at $16,500,000, and headed by Alberto and Bento Soares Campaio, brothers with large industrial interests in Brazil.

The facility will be of the newest airlift design, one of more than 20 licensed to the oil industry outside the Socony organization. Socony and affiliates have 13 T.C.C. airlift units at their own refineries.

Capuava is in the municipality of Santa Andre, 20 miles from Sao Paulo. Crude oil will be fed to the refinery from a pipe line starting at the seacoast port of Santos, 50 miles away. The pipe line rises 3,000 ft. 6 miles from Santos, to reach the plateau on which Sao Paulo is located.

Hydrocarbon Research, Inc., of New York City, is the contractor for the project.

AFRICA

No Shows in Nigerian Test

The first deep test drilled in Nigeria is at about 6,500 ft., but so far without indications of finding production, according to Anglo-Iranian Oil Co., Ltd.

The well is located at Ihuo, 70 miles north of the Port of Harcourt in the Niger delta. The operations are being carried out by Shell-D'Arcy Development Co. of Nigeria, jointly owned by Shell and Anglo-Iranian.

The two chief geologists of the companies, Dr. G. M. Lees for Anglo-Iranian, and C. E. Hobley for Shell, recently returned to London from a visit to this exploratory effort. Several geological and geophysical parties are operating in the area. Nigeria offers several types of difficult terrain, including delta swamps, forests, and the barren hilly country farther north.

Italy's Gas System

Abundant fuel supply plus conveniently located consumers have made it the largest transmission facility in Europe

Joseph A. Kornfeld

THE Po River Valley lines of Societe Nazionale Metanodotti (S.N.A.M.) has become the largest natural-gas transmission system in Europe.

Completion in December of 674 miles of pipe line ranging from 3 to 16 in. will increase total sales of S.N.A.M. from present volumes of 90 million cubic feet per day to 245 million cubic feet per day.

S.N.A.M. is an affiliate of Azienda Generale Italiana Petroli (A.G.I.P.), the government-owned company. With its favored position under Italian law, A.G.I.P. has become the most active Italian operator. S.N.A.M.'s system is the largest in the country. The remaining gas production in Italy is by a number of small companies.

Industrial market.—The network delivers a 1,000-B.t.u. gas under an average working pressure of 800-psig. to industrial markets in northern Italy. This market is comprised of foundries, steel mills, and motor-car manufacturers.

Currently, none of the natural gas is being sold for residential consumption; manufactured gas averaging 550 B.t.u. thermal value and L.P.G. supply a portion of rural and domestic needs.

Gasoline plant.—The first natural-gasoline plant for the Po Valley will go on stream at Cortemaggiore field early this year. J. F. Pritchard & Co., Kansas City, Mo., designed and constructed the plant which has a capacity of 106 million cubic feet per day. It will be owned and operated by A.G.I.P. The gas is rich with recoverable content of 8 to 10 gal. per M.c.f.

Natural gas development.—In 1945, gas production was found in Caviaga field at 4,225 ft.; 3 years later came the Ripalta discovery.

The major discovery, however, was made at Cortemaggiore in 1949. The hydrocarbon reserve of this field is larger than all of the other fields discovered in the Po Valley up to that date, and four producing horizons have been found. Open-flow capacity of wells in the 5,000-ft. horizon ranges from 15 to 100 million cubic feet per day.

Currently, Santa Fe Drilling Co., Santa Fe Springs, Calif., is drilling below 12,000 ft. in the Burdigalian (Upper Miocene) on a 16,000-ft. project.

During 1950, another gas field, Cornegliano Laudense, was discovered at a depth of 5,000 ft. in the vicinity of Caviaga field. Results suggest either a new field or a major extension to Caviaga. Two additional gas fields were found at approximately the same depth at Cremona and Piadena last year.

Six additional structures outlined by geophysics in the Po Valley are scheduled for early drilling by A.G.I.P. It is estimated that 20 geophysical structures remained to be tested in this area.

Deliverability.—Total deliverability of all A.G.I.P. natural-gas wells rose to an estimated 200 million cubic feet per day by the end of 1950 but construction of new lines had not kept pace with discoveries. However, the combined deliverability was 280 million cubic feet per day from about 80 natural-gas wells at the end of 1951.

Total deliverability of all of these fields will reach about 353 million cubic feet the latter part of 1952. The 1952 drilling campaign of A.G.I.P. calls for at least 40 additional wells comprising offset development in proved fields and wildcat exploration on geophysical structures. Most of the wells will be drilled to objectives lying at from 4,500 to 5,000 ft. Wellhead pressures will range from 2,200 to 2,500 psig.

Reservoir performance. — The slight pressure drop in many of the fields operated by A.G.I.P., particularly Cortemaggiore, attest to excellent reservoir performance. Generally, after a well has been taken off the line (A.G.I.P. rotates producing wells to prevent heavy drawdowns) there is a sharp recovery in well-head pressure.

Sales.—Currently, S.N.A.M. is selling approximately 90 million cubic feet per day. Average take from each well varies from 8 to 10 million cubic feet per day.

The position of A.G.I.P. in natural-gas production in Italy is steadily rising. Whereas, during 1949, A.G.I.P. accounted for 45.3 per cent of the total natural-gas sales, this percentage rose during 1950 to 59.0. When the 1951 figures are complete, this percentage is expected to reflect a still higher figure than the previous year.

Fuel requirements. — Enrico Mattei, member of Parliament and a top official of A.G.I.P. sand S.N.A.M., has stated that the problem of natural gas in Italy "is no longer a problem concerning production but one regarding distribution and utilization."

Although the total fuel requirements of Italy (in terms of natural gas) may range from 1,060 to 1,240 million cubic feet per day, he believes that the actual quantity of natural gas that can be marketed in Italy will range from 530 to 635 million cubic feet daily.

The Po River valley is a transmission company's "paradise," in that major gas reserves lie in the center of an industrial area and these large markets can be reached with a minimum of pipe-line miles. S.N.A.M. is able to transmit high-pressure gas to market without compressor stations.

International Briefs

Another new record in crude production was established in Venezuela in December. Output averaged 1,776,386 bbl. daily, up more than 22,000 bbl. daily over November. Venezuelan production set a new record in 11 of the 12 months of 1951. Only in August did a decline occur. December's production brought the daily average for the year to 1,704,643 bbl. This compares with 1,497,985 bbl. daily in 1950.

Saudi Arabian crude-oil production by Arabian American Oil Co., dropped back in December to 853,821 bbl. daily from the record high of 896,675 bbl. daily the previous month. During 1951, Saudi Arabian production averaged 761,541 bbl. daily. The Ras Tanura refinery ran 151,280 bbl. daily in November and averaged 159,199 bbl. daily through 1951. Despite the drop, Aramco continues to hold the position of the world's leading oil producing company. The former No. 1 company was Creole Petroleum Corp., principal producer in Venezuela. In December, government figures showed Creole's output averaged 804,866 bbl. daily. Second high company in Venezuela is Shell which averaged 567,933 bbl. daily in December.

Further preliminary testing has indicated a rate of about 1,100 bbl. daily for International Petroleum Co. of Colombia's Totumal discovery in the Magdalena Valley of Colombia. Gravity of the crude is 25°. The No. 2 well is drilling about 3,300 ft. east. First reports placed the production-test rate at 500 bbl. daily.

Middle East crude-oil price postings of the Socony-Vacuum Oil Co., Inc., organization are now being made by the new Socony-Vacuum Overseas Supply Co. The first posting issued by Socony-Vacuum Overseas Supply Co., effective December 24, 1951, noted the addition of a price of $1.67, f.o.b. Fao, Iraq, for crude from Zubair field which began commercial production in December. Socony-Vacuum Overseas Supply Co. has offices at 158 Linwood Plaza, Fort Lee, N. J.

PERSONALS

Irelan Steps Up

Cities Service Gas veteran named president of oil firm

S. B. IRELAN, president of Cities Service Gas Co. since 1944, has been named president of Cities Service Oil Co. at Bartlesville, Okla., succeeding A. W. Ambrose, who becomes chairman of the board.

Upon graduation from the engineering department of Purdue University in 1909 Irelan joined Denver Gas & Electric Co. of Nevada, a Cities Service subsidiary. He has been with the Cities Service system ever since, and has been for many years a key executive in the management of various Cities Service properties.

Irelan has served as vice president and general manager of Bartlesville Gas, Electric & Street Railway Co.; City Light & Traction Co., Sedalia, Mo.; Montgomery Light & Water Co., Montgomery, Ala.; and St. Joseph Railway, Light, Heat & Power Co., St. Joseph, Mo.

At the time of his election to the presidency of Cities Service Gas he was vice president of Electric Advisers, Inc., in charge of original costs, rates, and valuation studies.

As president of Cities Service Gas he directed the construction and operation of several major pipe lines, the most recent being the 26-in. line extending from Hugoton natural-gas field in Kansas and Oklahoma to Kansas City, Mo.

Charles P. Baker, manager of the Socony-Vacuum Oil Co., Inc., refinery in East St. Louis, Ill., has become a member of the firm's manufacturing committee at its headquarters at New York City. The committee coordinates all manufacturing activities at Socony-Vacuum refineries throughout the world. **Oliver C. Johnson,** operating superintendent at the refinery, succeeds Baker as manager.

A. W. Ambrose, president of Cities Service Oil Co. at Bartlesville, Okla., has been named chairman of the board. This move completes an executive reorganization program started last year. Ambrose joined the firm in 1923 as manager of its land and geological activities. **S. B. Irelan** succeeds Ambrose as president of Cities Service Oil, and **Glenn W. Clark** succeeds Irelan as president of Cities Service Gas Co. at Oklahoma City.

A. W. AMBROSE

H. G. Abadie, formerly senior production engineer for Long Beach Oil Development Co., Long Beach, has been appointed chief petroleum engineer.

V. L. VanderHoff has resigned from the geological department of Stanford University to become affiliated with Independent Exploration Co. at Santa Paula, Calif.

P. S. Magruder, executive vice president of General Petroleum Corp., Los Angeles, was elected president of the Petroleum Club of Los Angeles at the recent annual election. **Stan Natcher,** of Standard Oil Co. of California, was elected vice president; **J. G. Leovy,** of Western Gulf Oil Co., and **Fero Williams,** of Pacific Western Oil Co., were reelected secretary and treasurer, respectively.

Charles R. Elder, St. Louis, has been promoted to superintendent of Sohio Petroleum Co.'s southwestern division and will be responsible for all Sohio's transportation development and operations in Oklahoma, Kansas, Texas, Louisiana, Arkansas, and Mississippi.

George G. Hughes, head of the research unit of Interstate Oil Pipe Line Co.'s engineering department, Shreveport, has been granted a year's leave of absence to serve with the Petroleum Administration for Defense in Washington.

George H. Gray, division engineer at Midland, Tex., for Sinclair Oil & Gas Co., has been transferred to Fort Worth with the company's general staff to take charge of proration and other engineering matters before the commission.

Richard W. Hillyer, formerly division reservoir engineer for Carter Oil Co. at Shreveport, has joined Cummins & Brinkerhoff, consulting geologists at Houston, as petroleum engineer specializing in gas.

Frank Crews, superintendent at the Southeast Louisiana Gulf Coast division office of Atlantic Refining Co. at Franklin, La., has been transferred to Lafayette, La., and promoted to district manager.

J. D. Graham, process superintendent at Kirkuk, Iraq, for Iraq Petroleum Co., Ltd., has been appointed superintendent of the company's western division. Graham has been with I.P.C. at Kirkuk for the last 15 years and previously was with Anglo-Iranian Oil Co., Ltd.

Foster Parker has been elected vice president of Houston Pipe Line Co. replacing **C. Lee Wood,** who is retiring but who will be retained by the company as a consultant. Parker is also treasurer of Houston Oil Co. of Texas. **Robert L. Dabney,** assistant general manager of the pipe-line company, has been elected a vice president.

Richard K. Huey, production vice president of Deep Rock Oil Corp., will open offices in Tulsa as a petroleum consultant and gas-company owner. He will conduct an advisory and management service for oil and gas development. In addition he is organizing Cimarron Gas Co. which will operate a gas-transmission system in Payne and Lincoln counties, Oklahoma. Huey has been with Deep Rock for 31 years and was a pioneer in the electrification of drilling and producing oil properties in Mid-Continent fields.

H. J. Fromm, of Shell Oil Co. of Canada, Ltd., has been promoted from chemist to chief chemist in the Toronto Laboratory, succeeding **W. L. Rambo,** newly appointed chemicals buyer in the head office purchasing-stores.

George M. Luhn, who has been an independent operator at San Antonio for several years, has joined Slick-Moorman Oil Co. in that city as executive assistant to **James K. Ellis,** managing partner.

W. J. Nolte, of Stanolind Oil & Gas Co., has been elected president of the Fort Worth Geological Society. Other officers elected include: **J. H. Parrish,** Pure Oil Co., secretary; **D. G. Stookey,**

PERSONALS

The Texas Co., first vice president; **Thomas Nichols,** Rowan Oil Co., second vice president; and **J. J. Uri,** Texas Pacific Coal & Oil Co., treasurer.

P. C. Govreau, manager of operations in Continental Oil Co.'s petrochemical plant at Baltimore, Md., has been promoted to assistant manager of the manufacturing department at Houston.

Walter E. Hopper, consulting petroleum geologist at Tulsa, has closed his office and will devote his full time to being an exploration geologist.

C. A. Ward, district superintendent at Brownfield, Tex., for Continental Oil Co., has been transferred to Wichita Falls, Tex., in a similar capacity, replacing **C. C. Wilson,** who has been transferred to Hobbs, N. M., as district superintendent. **D. F. Jacobs,** assistant district superintendent at Hobbs, has been transferred to Brownfield succeeding Ward, and **J. R. Chestnolvick,** area production engineer at Fort Worth, has been transferred to Hobbs replacing Jacobs.

William C. Raymer has joined the geological staff of Union Oil Co. of California at Corpus Christi, Tex. He was formerly with Seaboard Oil Co.

Paul L. Lyons, formerly staff geologist for Carter Oil Co., has joined Anchor Petroleum Co. at Tulsa as exploration manager. Lyons is editor of Geophysics, quarterly publication of the Society of Exploration Geophysicists. He was graduated from DePauw University in 1933 with a B.A. degree in geology, and joined Carter in 1935. In 1942 he received a M.Sc. degree in geology from the University of Tulsa.

Carl F. Beilharz, formerly division geologist for Pure Oil Co. in the Gulf Coast area, has opened consulting geological offices in Houston.

Jack Horton Cockburn has been elected president of Cockburn Oil Corp., Houston, succeeding **H. C. Cockburn,** who was elected chairman of the board of directors. **Lee B. Stone** was elected vice president of the firm. Other officers elected include: **Lunn H. Cockburn,** vice president; **Jeannie F. Haas,** secretary; and **J. L. Webb,** assistant secretary and general counsel. Members of the board are: **Dr. J. Schander, A. Birnbaum, M. L. Randall,** Webb, and Stone.

GEOPHYSICAL OFFICERS.—New officers of the Dallas Geophysical Society for 1952 are, left to right: C. G. Dahm, Magnolia Petroleum Co., secretary-treasurer; J. P. Woods, Atlantic Refining Co., president; Milton B. Dobrin, Magnolia, first vice president; and Howard Cobb, Atlantic, second vice president.

J. Lusk has been promoted to assistant chief chemist at the Montreal refinery of Shell Oil Co. of Canada, Ltd., succeeding **G. T. Perry.**

H. E. Zoller of Wichita, **Glenn W. Peel** of Hoisington, Kans., and **Irv Hardman** of Hill City, Kans., have organized Jet Drilling Co., Inc., with offices at Wichita.

Robert B. Wing has been appointed division geologist for Shell Oil Co. in the Rocky Mountain division. Wing was formerly in the Tulsa area. He succeeds **Alex Clark** who resigned. Wing first joined Shell as a field geologist in Oklahoma in 1934.

C. E. Baker has resigned from the geological department of Richfield Oil Corp., Los Angeles, to become a subsurface geologist with Arabian American Co. He has gone to Beirut, Lebanon, and after 6 months will be stationed at Dhahran, Saudi Arabia.

O. H. Griffiths has been appointed general manager of the production-operations division of Iraq Petroleum Co., Ltd., and associated companies, and **R. Hayes** has been named chief engineer. Griffiths was with Anglo-Iranian Oil Co., Ltd., for 13 years before joining I.P.C. in 1932. He served as fields manager of Syria Petroleum Co., Ltd., as Basra fields manager, and as pipe-line superintendent before his transfer to the London office in 1945. Hayes joined Anglo-Iranian in 1924, becoming chief refinery engineer, before he took a position with Middle East Pipelines, Ltd., in New York. He joined I.P.C. in 1950 for special duties in connection with the new 30-32-in. line.

Robert J. Shields has been elected president of the newly organized Shields Drilling Co., Inc. **Richard J. Shields** will be vice president and **Harold Dumler,** secretary-treasurer.

J. A. Jackman, assistant division production superintendent for Sinclair Oil & Gas Co. at Casper, Wyo., has been promoted to the Kansas-Tri-State division of the company with headquarters at Independence, Kans. **J. B. Kennedy,** assistant division superintendent at Midland, Tex., has been transferred to Casper.

Dean Terrill has resigned as vice president and general counsel of Kerr-McGee Oil Industries, Inc., Oklahoma City, but will remain with the company as director and special counsel. He will return to the general practice of oil law in Chicago, which he left 15 years ago to assist in the formation of Kerr-McGee.

PERSONALS

Harry Hurt, a former partner in Callery & Hurt, Inc., has formed Hurt Oil Co. at Houston.

Ross E. Wells, who recently resigned from Pure Oil Co.'s geological department at Durango, Colo., will open an office for Lion Oil Co. there.

W. E. Winn, formerly representative of Ashland Oil & Refining Co. in Louisiana, Mississippi, and the Gulf Coast region, has joined Southern Natural Gas Co. as manager of the exploration and production division of the firm. In this position he will be in complete charge of the exploration, drilling, geological, and production activities of the company and will also be engaged in the procurement of its gas and gas reserves.

James F. Neill has been promoted to general superintendent of drilling and production in the producing department of The Texas Co.'s West Texas division. Neill was formerly assistant to the division manager. His headquarters will continue to be in the division office at Fort Worth.

Tom V. Marks, who has been in charge of development in West Texas and New Mexico for Neville G. Penrose, Inc., has been named vice president in charge of production. Marks' entire career has been in the production end of the oil business, starting in 1930 at Seminole, Okla. He joined the Penrose interests in 1938.

D. L. Harlan has been promoted to assistant chief petroleum engineer of The Texas Co. He will move from Fort Worth, Tex., to Houston and will be succeeded as division petroleum engineer by **G. R. Brown.** Harlan has been with Texaco since 1933, starting as a rotary-rig helper at Port Neches, Tex., after being graduated from the University of Texas with a B.S. degree. Brown has been with the firm since 1940.

D. B. O'Neill, Jr., Shell Oil Co. engineer at Long Beach, Calif., has been elected chairman of the Pacific petroleum chapter of the American Institute of Mining and Metallurgical Engineers. **R. H. Burke,** Southwest Exploration Co., Huntington Beach, was appointed secretary; and **Ced Ferguson** of Standard Oil Co. of California, Los Angeles, was made program chairman for the year.

Paul D. Torrey, partner of Oil Recovery Chemicals, Austin, Tex., will be awarded a Ph.D. degree by Marietta College in recognition of outstanding accomplishments in petroleum engineering. The degree is to be conferred February 14 at the 117th anniversary celebration of the founding of Marietta College.

Harry D. Aggers has been named manager of secondary-recovery operations for Union Oil Co. of California. Before being transferred to Los Angeles to head the new department, he was superintendent of the San Joaquin Valley division at Bakersfield, Calif. **John R. Fraser,** formerly in the southern division offices at Whittier, Calif., succeeds Aggers at Bakersfield.

Harry M. Kilian, who has been associated with Oil Properties Consultants, Inc., Pasadena, Calif., for the past 5 years, has opened offices as a consulting geologist in Pasadena.

R. L. Augenthaler, division superintendent in Dallas for Standard Oil Co. of Texas, has been transferred to San Angelo, Tex., as head of the new district office being established there. **G. W. Oliver,** head of the Abilene, Tex., office, has been transferred to Dallas.

Dr. Jose Martorano Battisti has joined Shell Caribbean Petroleum Co. as assistant manager and member of the executive committee at Caracas, Venezuela. He will spend several months abroad studying the operations of companies associated within the Royal Dutch-Shell Group before taking up his appointment in Caracas.

John S. Russell, formerly production foreman in Magnolia Petroleum Co.'s Falfurrias, Tex., district, has been promoted to assistant district superintendent of the Falfurrias district. **William C. Crone** has been promoted from gang pusher to assistant foreman in the Electra, Tex., district, and **Charles W. Hickok** has been transferred from Pampa, Tex., to Electra as petroleum engineer. Other changes in the firm include: **Charles L. Barney, Ralph D. Burks, Ernest R. Frazier,** and **James E. Leonard,** transferred from Kermit, Tex., to the newly formed Pegasus district in West Texas as petroleum engineers. Also transferred from Kermit to Pegasus were **A. W. Shaw, Jr.,** and **Clarence Wells, Jr.,** as petroleum-engineering assistants.

Ray Goodin, formerly geologist with Great Lakes Carbon Corp., has joined Kiowa Drilling Co., Inc., and Kiowa Oil Co. as geologist at Wichita.

Morris B. Carlton, formerly in Union Oil Co. of California's Houston office, has been transferred to Shreveport as district geologist replacing **Hamlin Fox,** who has joined Superior Oil Co. at Tyler, Tex., as district geologist.

George Johnson, geologist with Midstates Oil Corp., has resigned and joined British American Oil Producing Co. in the same capacity.

T. W. Belton, engineer with Interstate Oil Pipe Line Co., has resigned to enter business for himself in Florida.

L. E. Patterson, of Cities Service Oil Co., has been elected president of the West Texas Geological Society for 1952. Other officers elected include: **Max David,** consulting geologist, vice president; **Nugent T. Brasher,** Stanolind Oil & Gas Co., treasurer; and **Paul H. Kolm,** of Permian Basin Sample Laboratory, secretary.

Donald B. Beecher, formerly vice president and general manager of Kentucky West Virginia Gas Co., has been elected vice president and general manager of Equitable Gas Co. at Pittsburgh, parent company of Kentucky West Virginia Gas. **Thomas H. Evans,** formerly assistant to the vice president in charge of operations of Equitable, will succeed Beecher as vice president at Ashland, Ky.

DEATHS

Francis C. Wilson, president of Wilson Oil Co., Santa Fe, N. M., died there recently.

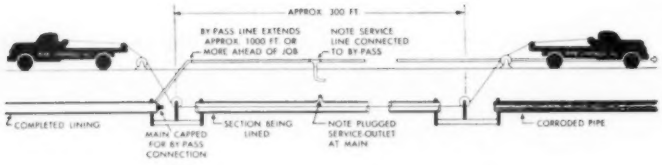
Ernest Edward Morey, 70, veteran pipe-line-department employe of Mid-Continent Petroleum Corp., died January 29 in Tulsa. He had been with Mid-Continent for 34 years.

Edward MacTaggart, retired oil producer, died at Marietta, Ohio, January 26. He had been director of Selby Oil & Gas Co. of Tulsa.

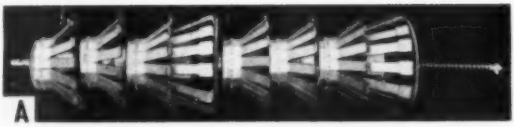
David King Noland, 76, retired oil-well driller, died recently at Marietta, Ohio.

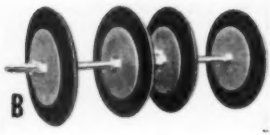
J. A. Crume, who had been with Creole Petroleum Corp. in Venezuela for the past 7 years, died recently in Caripito, Venezuela.

Cement-Lining Operations


APPROX. 300 FT.
BY-PASS LINE EXTENDS APPROX. 1000 FT. OR MORE AHEAD OF JOB
NOTE SERVICE LINE CONNECTED TO BY-PASS
COMPLETED LINING
MAIN CAPPED FOR BY-PASS CONNECTION
SECTION BEING LINED
NOTE PLUGGED SERVICE-OUTLET AT MAIN
CORRODED PIPE

Tate Method . . .

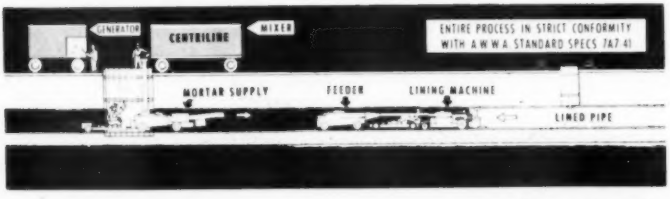




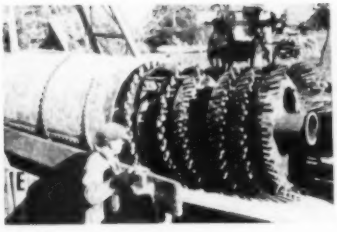
. . . and its tools

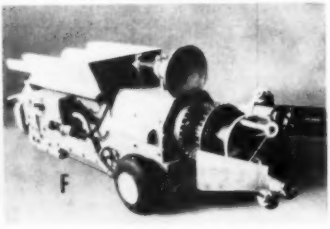
A—Scraper
B—Swabber
C—Liner
D—Cementer
E—Scraper
F—Liner

Centriline Method . . .



. . . and its tools





TWO processes for lining pipe **in place** with cement are now available on the West Coast. Already used extensively on large-diameter water lines and the like, the methods as now improved perhaps may be adaptable to certain classes of oil, gas, and waste-disposal lines in the oil and gas industries, under some conditions.

Among advantages of the methods, according to the developers, are:

1. Leak stoppage in old lines.
2. Protection against corrosion.
3. Protection against discoloration and contamination.
4. Efficient cleaning and relining with only short interruption to service required by installation of temporary bypass lines.
5. Improved flow coefficients and reduced pumping costs, if old pipe was previously tuberculated and encrusted with rust.
6. Reduction in future maintenance costs.

The two processes are the Tate method, for 4 to 16-in. pipe, and the Centriline method, for 16-in. pipe and larger.

Tate process.—In this method, 300 or more feet of pipe is isolated by installing a temporary bypass. The cleaning scraper (see "A" in drawing) is pulled through the pipe section by means of trucks equipped with power winches. Next a swabber ("B") is pulled through to test for obstructions, and clean the pipe.

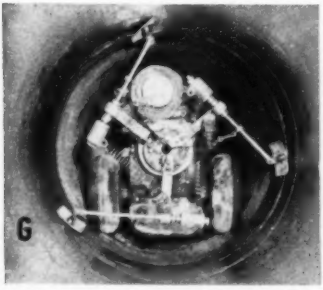
Meanwhile, mortar is being prepared (see "D"). Mix used is one part Portland cement to between 2 and 2½ sacks of fine sand mixed with water to proper consistency.

Mortar is fed into the open end of the pipe section. Then cement lining plug ("C") is pulled slowly through to leave a smooth, even thickness of well-compacted cement-mortar lining, normally 3/16 in. to ¼-in. thick.

Elliptical springs attached to liner are slightly larger in diameter than the pipe to be lined and are set at 90 degrees to each other. These springs hold lining machine centered as it is drawn through pipe. The hollow skirt of the plug is perforated so that any excess water goes through openings (see "C").

FOR 16-in. and larger pipe, the mechanical scraper ("E") is first run Then cement mortar from the hopper of the Centriline lining machine is forced by a worm feed into a rapidly revolving dispenser head, from which it is thrown by centrifugal force at high speed and distributed at the desired thickness on the pipe wall.

Immediately following the dispenser head are two or more sets of slowly rotating steel trowels (see "F") which follow directly behind the spread mortar and give the sur-

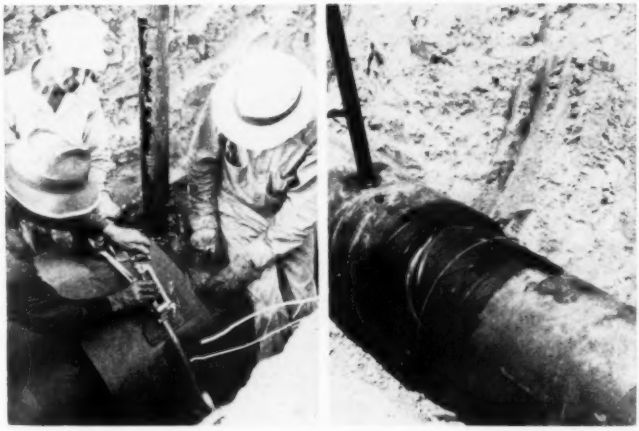


G—Photo taken inside pipe, showing Centriline cement-lining machine in actual operation.

face of the lining a smooth, hard finish. After the lining has set initially, it is carefully cured and the pipe placed back in service.

The Centriline process has been used successfully on over 284 miles of 16-in. and larger diameter pipe.

Pipe Linings, Inc., subsidiary of American Pipe & Construction Co., has made both Tate and Centriline services available in western states.



New Seal for Pipe-Line Casings Saves Time

A new time-saving seal for pipe-line casings has been invented by Al Stegner, pipe-line engineer, Tennessee Gas Transmission Corp. Requiring no special tools or skilled laborers, the seal is simple to install on crossings beneath roads and railways. Shown at left are two pipe liners illustrating how blanket and clamps are used for the seal. Right, a finished job, showing clean coating of plastic tape and cement on the casing. A patent application is pending on this invention.

Mud-Pump Platforms

They keep equipment clean on Philips Petroleum rig

STEEL platforms have been installed around the mud pumps on a drilling rig of Phillips Petroleum Co. in New Mexico to keep equipment clean during muddy conditions.

The platforms are tailored for the particular position each section is to occupy at the rig, and are supported on angle-iron standards and sled-runner bases designed to rest on planking laid on the ground.

For example, the section to be placed on the outside of a pair of mud pumps, where men approach the units from the stairway from the rig floor, has a single walk built for this particular position. A sheet of treadstock steel is laid on a framework constructed of angle iron. The rectangular frame is supported by five vertical posts on each side which in turn are welded to the sled runner which rests on ground planking.

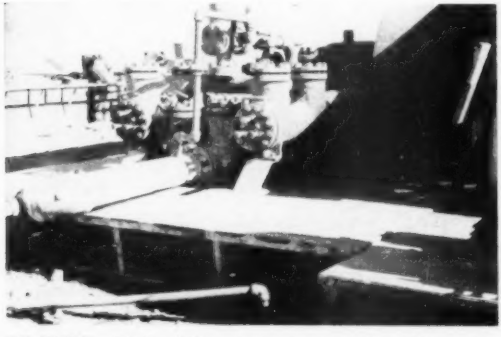
One end of the frame extends forward and is supported by a diagonal piece of angle iron which forms the turned-up point for skidding, after being unloaded from oil-field truck.

The side adjacent to the pump is cut to fit the particular unit being used, and forms a tight joint between the platform and the mud pump itself. All material used in the platform is heavy enough to support men and tools when repairing the unit, or inserting new liners, pistons, and rods.

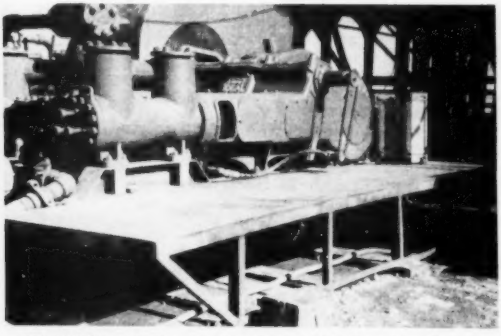
Turn Your Idea Into Cash!

Do you have an idea which will save time, money, or effort on your job—either in the fields or in the plants? Then why not let others know about it?

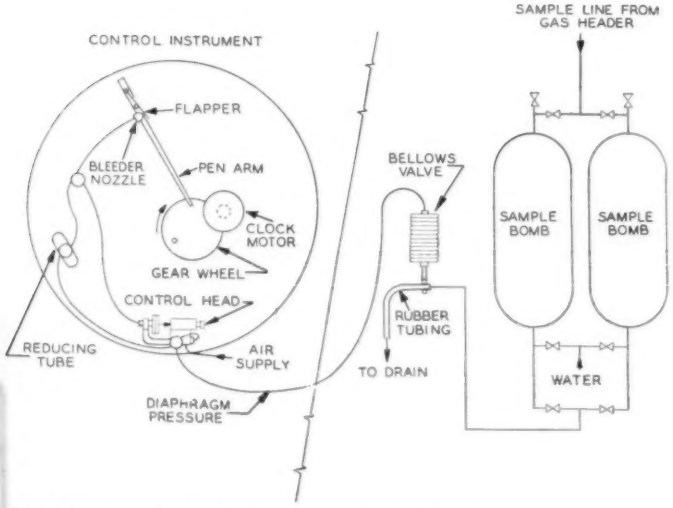
The Journal pays cash for all acceptable items. Address yours to: Editor, "On the Job," The Oil and Gas Journal, Box 1260, Tulsa, Okla. Photographs and manuscripts will be returned if requested.



AT ENDS.—Steel platforms across ends of mud pumps to form walkway between units.



ON SIDES.—Platforms placed on each side of mud pumps for convenience of personnel.



GAS-SAMPLE CONTROLLER.—Automatic device built for obtaining representative 24-hour gas samples.

Accurate Controller

Representative 24-hour gas samples taken by unit

A CONTROLLER has been adapted by Parade Co., Overton, Tex., to the chore of obtaining representative 24-hour gas samples.

Developed by Robert Gene Patterson, laboratory technician, and Delbert Gray, junior engineer, the sampler has operated surprisingly well since installation. Difficulty previously had been experienced in obtaining the gas samples by water displacement in 9-gal. sample bombs.

Assembly.—An extra temperature recorder-controller was utilized as an interval controller for the sampling system (see drawing). The instrument's electric clock was dismantled and all the gears except one removed. This gear was operated by the clock at one revolution every 6 minutes. A small rod was soldered near the outer edge of the gear wheel.

The recording pen on the instrument was removed and replaced with one of proper length. The new pen arm was long enough to reach the outer portion of the gear wheel. Thus, as the clock motor turns the gear wheel, the rod soldered on the gear wheel comes around every 6 minutes and moves the pen arm a short distance, the arm dropping back to its normal position as the rod on the gear wheel moves on around. The pen arm is connected to the regular instrument pen shaft which in turn moves the flapper off the air bleeder, causing the air pilot controller to release air pressure on diaphragm.

A diaphragm type off-on valve was constructed using the bellows from the instrument. The bellows, when expanded, pushes a steel rod against a piece of rubber tubing compressing it until it is closed. When the diaphragm pressure is released, the bellows contracts allowing the rubber tubing to open. The rubber tubing is fastened to the water drain connections on the sample bombs so that water can be drained out through the tubing when the bellows contract.

Results.—After the renovated instrument was connected, the electric clock wired, and the air supply piped, the controller opened the rubber tubing for a few seconds, each time the rod on the gear wheel picked up the pen arm. This operation allows water to drain out of the sample bombs at 6-minute intervals thereby collecting a representative 24-hour gas sample by drawing into the bombs a small volume of gas every 6 minutes.

Details of the controller were disclosed at the "Operating Kinks" session of Natural Gasoline Association of America, held in Tyler, Tex.

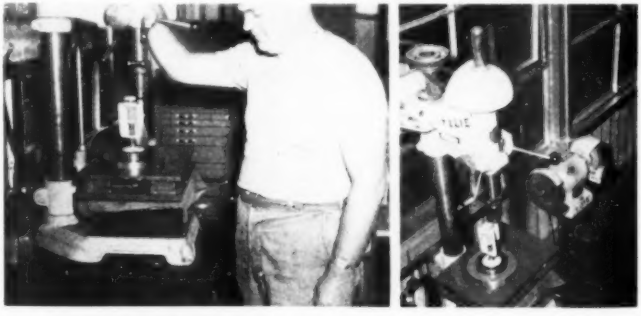
Closer Control of Column Temperature Is Obtained

A much closer control point can be obtained through use of a temperature controller from a tray in a column. The idea was developed by W. W. Mason, operating supervisor for Phillips Petroleum Co. at Phillips, Tex.

A thermocouple is put in the tray which has the greatest temperature variation, as this is the point from which temperature is ordinarily controlled. Results will be a much closer control, with fractionation kept equalized in the unit (this particular column had 60 trays and a 75 per cent kettle product and 25 overhead.

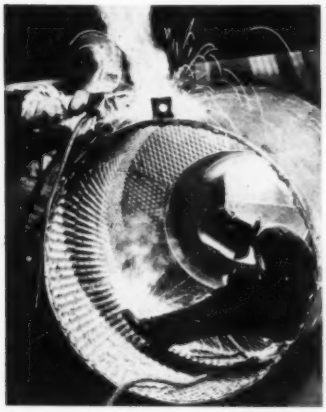
Mason states that there must be 25 per cent of trays in the top section in order to equalize them. Therefore, the bulb was on the forty-fifth tray in the column he dealt with.

Mason was awarded third prize in Class B by Natural Gasoline Association of America at Amarillo, Tex.

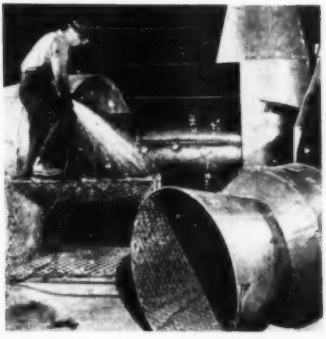


Invention Cuts "Lapping" Time

"Lapping" seal-oil sealing collars used on centrifugal compressors can be done more quickly, thanks to the machine above, which was designed by Operator Carl Hutchinson of Tennessee Gas Transmission Corp., Moorhead, Ky. The device eliminates the job formerly done by hand and which formerly required 24 hours' labor. With the new attachment, collars may be lapped in about 4 or 5 hours, and the machine does not need constant supervision while in operation. Closeup view is shown at left.



New Lining Holds . . .



Cast Refractories

STRETCHED-STEEL lining designed to cut cat cracking costs by reducing deterioration of cast refractory is being introduced at the Baton Rouge, La., refinery of Esso Standard Oil Co.

When cast refractory is put into 10 new cyclone catalyst separators there, it will be applied over Wheeling Corrugating Co.'s expanded metal to hold it permanently in place.

Expanded metal—solid sheet steel that has been slit and stretched on huge presses—is used to form the base on which abrasion-resistant refractory is cast after the cyclone vessels have been erected at the refinery site.

The cyclone units, designed by Ducon Co., Mineola, N. Y., and fabricated for Esso's Baton Rouge refinery by Steel & Alloy Tank Co., Newark, N. J., are about 21 ft. high and have a maximum diameter of more than 6 ft. Their function in the catalytic cracking process is to separate and recover solid catalyst particles from the hot flue gases leaving the cat cracker regenerator.

Helical path.—Inside the cyclones, the high-speed stream of flue gas and catalyst follows a descending helical path. This separates the solid catalyst particles, which fall to the bottom for reclaiming and reuse, while the hot gases pass out through a central pipe.

Supplied in large, one-piece sheets with diamond-shaped openings, the special wide-strand expanded metal is cut to shape and formed by cold rolling to fit the concave inner surface of the cyclone separators. Arc welding attaches the expanded metal firmly in place, ready to receive the cast refractory after the cyclone units have been installed at the refinery.

Measurement Aid

Unusual support bracket designed by Quintin H. Gambrell of Magnolia Petroleum aids measuring crank-bearing clearance

Clearance on crank bearings can be measured accurately and easily by use of an unusual support bracket which is designed for use with a standard 0.001-in. graduated surface gage.

The bracket was devised by Quintin H. Gambrell, plant repairman for Magnolia Petroleum Co. at Kilgore, Tex. It enables clearance measurement on crank bearings where there is not enough room to use a feeler gage.

The bracket is in the general shape of a "C" clamp, with a rectangular steel plate opposing a screw for tightening across the crank. Details of the device were given members of the Natural Gasoline Association of America at its "Operating Kinks" session held in Tyler, Tex.

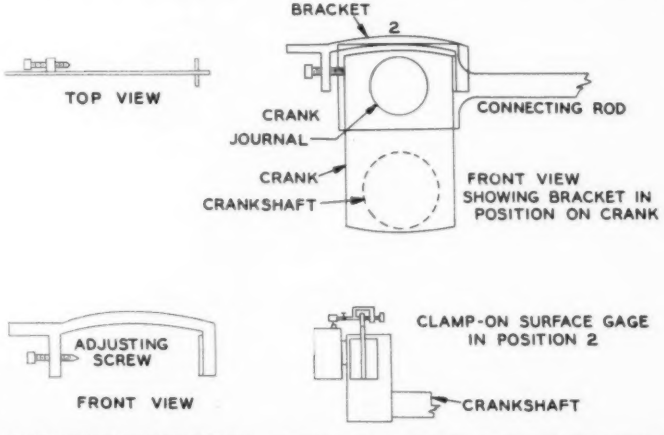
To measure clearance, a surface gage is clamped to the top of the arch of the bracket with a universal clamp and a small "C" clamp. With the crank in a vertical position, the surface gage is set rigidly against the top of the connecting rod and the initial reading taken.

By use of an overhead chain hoist, the connecting rod is then elevated carefully until the bearing is in contact with the underside of the crank journal. A final reading is then taken. Difference between the initial and final reading is the clearance.

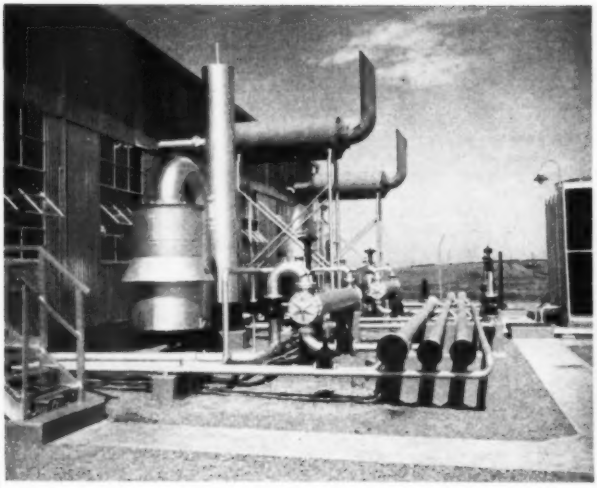
Horizontal clearance may be measured similarly by moving the surface gage to Position 2 (see drawing) and setting the gage shaft against the end of the connecting-rod bearing cover.

By using a flywheel jack to oppose a bar through the spokes of the flywheel, a rocking motion may be created to move the bearing through its clearance and not disturb position of the crank. Readings are taken in the same manner as in the case for measuring vertical clearance.

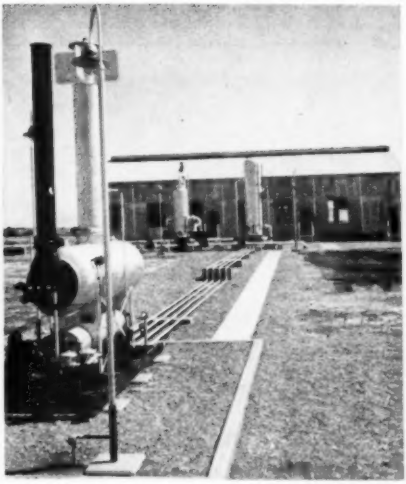
Gambrell reports that his device was designed specifically for use on Type GMB Cooper-Bessemer direct-connected engine-compressor units.



GAGE-SUPPORT BRACKET.—Details of gage-support bracket which enables accurate measurement of clearance on crank bearings.



Exterior view of compressor station which boosts produced gas from 500 to 2,050 psig. for injection into Third Deese sand reservoir.



View of heater-treater installation: high-pressure and low-pressure separators are shown in background.

25 Per Cent More Oil

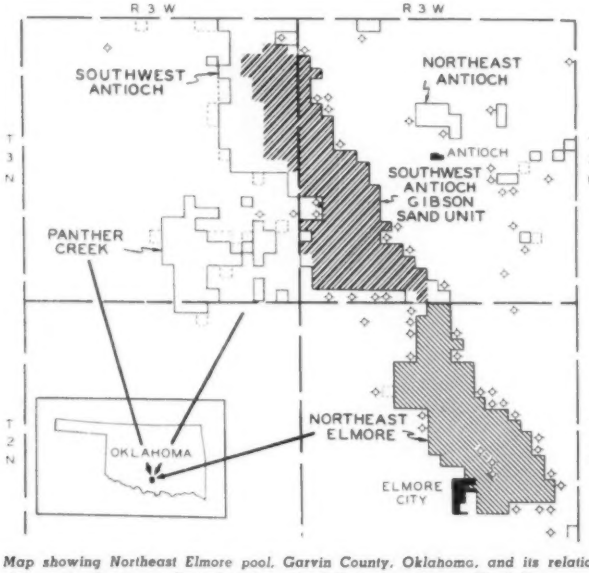
. . . through pressure maintenance

Full-scale gas injection started October 1, 1951, into 6,600-ft. sand bar in South-Central Oklahoma to create gas cap

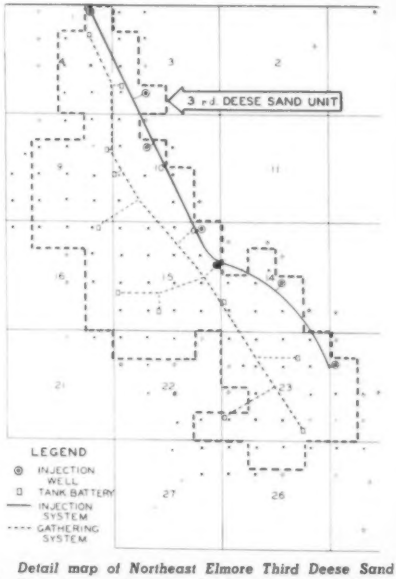
by Joseph A. Kornfeld
Mid-Continent District Editor

MORE than 25 per cent additional oil over primary production is estimated obtainable through full-scale gas injection into a 6,600-ft. Pennsylvanian zone in Northeast Elmore field, Garvin County, Oklahoma. The field covers 3,320 acres, and contains 111 oil wells with an average daily production of 3,465 bbl.

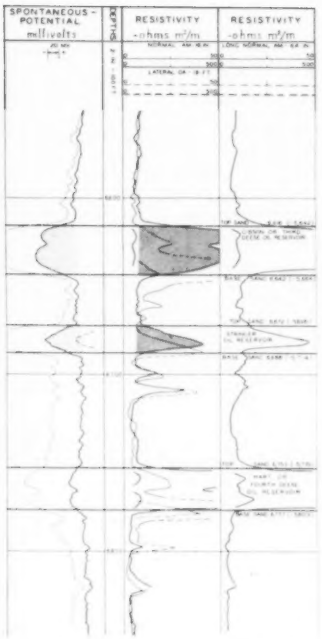
Gas injection started October 1, 1951, into six wells located strategically on the east updip pinchout of the Third Deese sand. Currently 19,000



Map showing Northeast Elmore pool, Garvin County, Oklahoma, and its relationship to the Southwest Antioch Gibson Sand Unit, an adjacent Third Deese sand reservoir which is operated also under pressure maintenance.



Detail map of Northeast Elmore Third Deese Sand Unit showing location of oil wells, gas gathering system, injection wells, and gas return lines.



Type electric log of pay section detail for Northeast Elmore Unit, Garvin County, Oklahoma, showing formations extending from the top of the Gibson or Third Deese oil reservoir down through the Hart or Fourth Deese sand. The well is Carter Oil Co. 1 Smith-State, NW SE SE 22-2n-2w, completed August 18, 1949, for 257 bbl. of oil in 24 hours through choke after perforations from 6,614-45 ft. and from 6,671-88 ft. Mud resistivity is 1.6 ohms m.m. at 84° F. and electrode spacings are AM = 16-in., AM = 64-in., and AO = 19 ft. Hole size is 9-in.

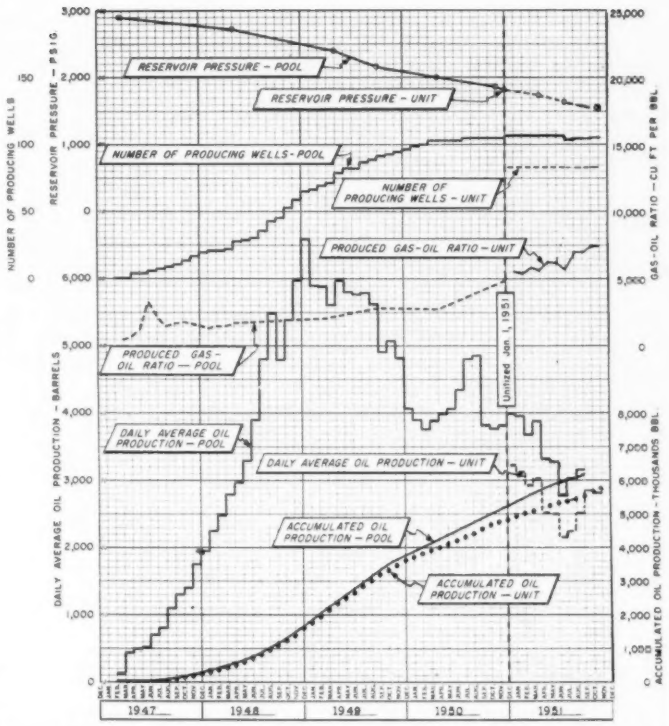

RESERVOIR PRESSURE - POOL
RESERVOIR PRESSURE - UNIT
NUMBER OF PRODUCING WELLS - POOL
NUMBER OF PRODUCING WELLS - UNIT
PRODUCED GAS-OIL RATIO - UNIT
PRODUCED GAS-OIL RATIO - POOL
Unitized Jan 1, 1951
DAILY AVERAGE OIL PRODUCTION - POOL
DAILY AVERAGE OIL PRODUCTION - UNIT
ACCUMULATED OIL PRODUCTION - POOL
ACCUMULATED OIL PRODUCTION - UNIT
NUMBER OF PRODUCING WELLS
RESERVOIR PRESSURE - PSIG
DAILY AVERAGE OIL PRODUCTION - BARRELS
GAS-OIL RATIO - CU FT PER BBL
ACCUMULATED OIL PRODUCTION - THOUSANDS BBL
1947
1948
1949
1950
1951

Chart showing reservoir performance of Northeast Elmore pool under primary operation from discovery in April 1947, and under unitization from January 1, 1951; full-scale gas injection started October 1, 1951.

M.c.f. daily of produced gas is being returned to the reservoir to assist the primary gas-expansion reservoir drive. Present compression facilities comprise two 880-hp. angle-type compressors which boost the gas from 500 to 2,050 psig. for injection purposes.

Unit-Operation Advantages

The original Third Deese Unit of 83 oil wells at Northeast Elmore field was formed on January 1, 1951, by Carter Oil Co. as operator for itself and 22 other signatory firms. To that date, the field produced 5,234,352 bbl. of stock-tank oil and 13,159,000 M.c.f. of gas from 104 producing oil wells. Accumulative gas-oil ratio for the field was 2,514 cu. ft. per bbl.

Immediate advantages accruing from unit operation at Northeast Elmore include:

Conservation of produced gas and quadrupling of residue gas sales.

Improvement in recovery factor through reduction of the produced gas-oil ratio through selection of low gas-oil ratio wells for making the field allowable.

Important savings in surface equipment through consolidation of tank batteries and separation stations.

During July 1951 the unit produced an allowable of 2,152 bbl. daily with a gas-oil ratio of 5,670 cu. ft. per bbl. Under competitive operation, the 83 wells would have produced an aggregate allowable of 1,994 bbl. daily with a gas-oil ratio of 6,220 cu. ft. per bbl.

Gas-oil ratios.—Gas injection started during September 1951 with full injection by October 1, 1951. The following correlates gross and net produced gas-oil ratios for the unit during the fall of 1951:

Month in 1951—	Cu. ft./bbl. Gross G.O.R.	Cu. ft./bbl. Net G.O.R.
September	6,987	6,032
October	7,356	3,921
November	7,495	3,105

Battery Consolidation

Economies under unit operation include savings in surface equipment through consolidation of lease tank batteries and separators. The 58 individual lease batteries which formerly comprised the producing area included in the original 83-well unit, have been consolidated into only 13 large batteries. These batteries are equipped

TABLE 1 — PARTICIPATION FACTORS BY COMPANIES, NORTHEAST ELMORE 83-WELL UNIT, GARVIN COUNTY, OKLAHOMA

	Participation* per cent
Anderson-Prichard Oil Corp.	0.890145
British-American Oil Producing Co.	0.795409
Carter Oil Co.	52.621547
Deep Rock Oil Corp.	0.627739
Globe Oil & Refining Co.	4.889178
Kerr-McGee Oil Industries, Inc.	0.019338
Magnolia Petroleum Co.	5.237411
Mid-Continent Petroleum Corp.	0.296715
Phillips Petroleum Co.	11.701398
Max Pray	0.544305
Sinclair Oil & Gas Co.	5.997830
Sun Oil Co.	1.685902
Superior Oil Co.	9.333624
Tide Water Associated Oil Co.	0.781632
Vickers Petroleum Co., Inc.	2.314661
Wrightsman, Charles B.	2.132509
Zephyr Petroleum Corp.	0.130657
Total	100.000000

*Status as of January 1, 1951.

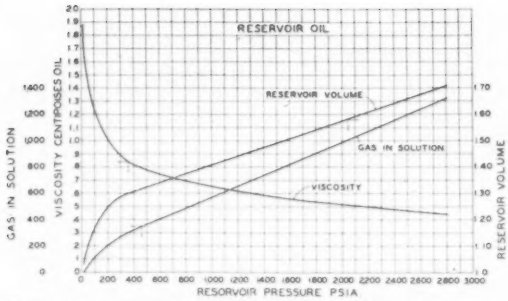


Chart showing reservoir-oil characteristics of Third Deese sand bottom-hole sample.

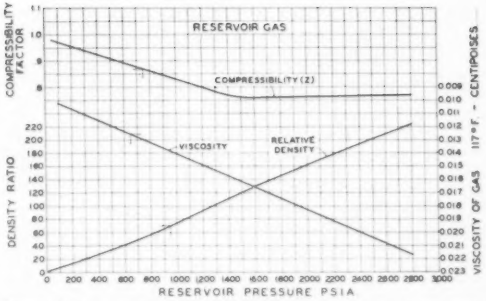


Chart showing reservoir-gas characteristics of Third Deese sand bottom-hole sample.

with high-pressure separators to utilize the natural well-head pressure and thus minimize compressor-horsepower requirements.

Reservoir Characteristics

Producing Deese sands of lower Pennsylvanian age lie unconformably on the truncated pre-Pennsylvanian surface, in Garvin County. These form gas and oil reservoirs of a stratigraphic type. The producing sand is a sand-bar deposit laid down in a northwest-southeast direction on the west flank of the Pauls Valley uplift. Locally, the sand is called the "Third Deese" or "Gibson."

The reservoir is defined on the east by the truncated edge of Third Deese sand deposited along the west flank of the uplift. Western limits of the field are defined by gradation of sand into shale. Within the limits of the Northeast Elmore Unit, the sand dips at a rate of from 200 ft. per mile in a southwesterly direction. Pay thickness varies erratically but averages 24 ft.

Lithology. — Third Deese sand is composed of well-cemented calcareous sandstone. In the main sand body, the texture is fine to coarse grained grading to a conglomerate at the base. Within the sand are interbedded thin shale laminae and clay pellets. (See chart on typical electrical-log characteristics.)

Other reservoirs producing from the Third Deese sand are Southwest Antioch field (adjoining Northeast Elmore to the northwest), Katie, Southwest Maysville, and New Hope fields. On the west flank of the Pauls Valley uplift, this group of Third Deese reservoirs forms a long, narrow belt along a northwest-southeast trend; over-all length is 22 miles and the field varies from 1 to 2 miles in width.

Reservoir oil and gas.—The Third Deese reservoir contains 43° A.P.I. oil in the Elmore-Katie-Southwest Antioch area. The formation was saturated with gas at the original reservoir pressure and small condensate-bearing gas pockets occur erratically throughout the area at the east, updip side.

A bottom-hole sample believed representative of Northeast Elmore reservoir crude was taken in the Katie area which adjoins to the southeast. Characteristics of the sample obtained by laboratory analysis were extrapolated to the original reservoir pressure of 2,809 psia. (corrected to —5,174 ft.). This indicated a differential liberation at 117° F. of 1,326 cu. ft. of gas per bbl. of stock-tank oil and 1.71 reservoir barrels per barrel of stock-tank oil. Viscosity of reservoir oil increases from 0.44 cp. at original pressure to 1.87 cp. at atmospheric pressure. (See charts on reservoir fluids.)

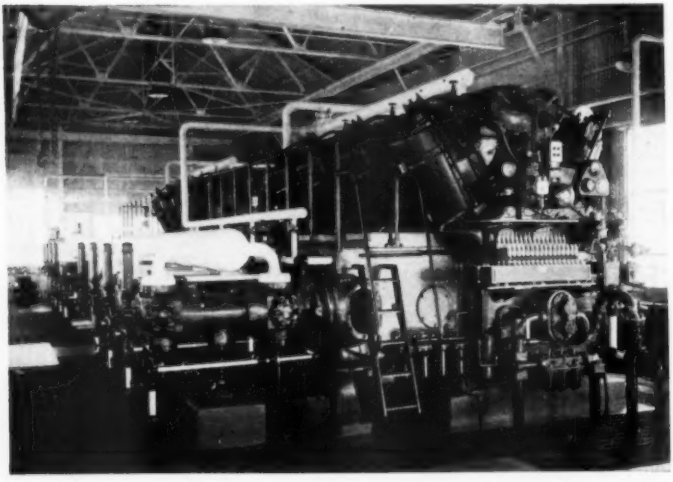
Stock-tank-oil volume. — Computation is shown here of the unit volume of stock-tank oil originally in place in the Third Deese sand at Northeast Elmore field:

	Bbl./ acre-ft.
Formation volume	7,758
Pore volume	1,257
Hydrocarbon volume	1,012
Stock-tank oil	592

General reservoir data for Northeast Elmore Third Deese sand unit is as follows:

Porosity, per cent	16.2
Permeability to air, md.	*106
Connate water, per cent of pore space	†19.5
Productive area, acres	3,320
Net sand thickness, ft.	24
Original reservoir pressure, psig.	2,925
Reservoir temperature, °F.	130
Total gas in solution, cu. ft. per bbl.	1,250
Produced oil gravity, °A.P.I.	43

*Based on permeabilities above 10 md. from 26 cored wells. †By capillary pressure method.



Interior view of compressor station at Northeast Elmore showing two 880-hp. angle-type compressors used to boost gas for return to Third Deese reservoir.

Development History

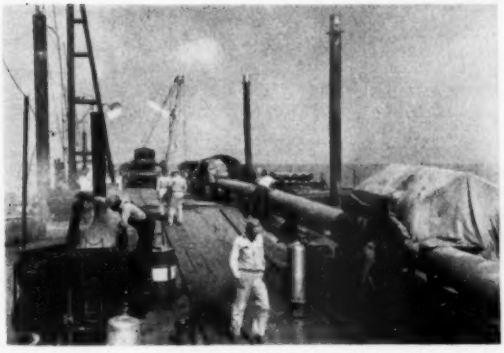
Discovery well of Northeast Elmore was completed during April 1947 by Anderson-Prichard Oil Corp. 1 Seaton, SE SE NW 14-2n-2w. Third Deese sand was logged from 6,424-54 ft. Initial production was 912 bbl.

Development proceeded rapidly along a northwest-southeast trend. Limits were extended northwestward to Southwest Antioch field, and to Katie field on the southeast. (See area map of fields.)

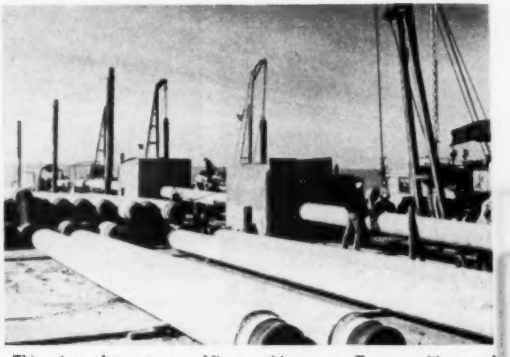
To date a total of 111 producing oil wells and 1 gas well (shut in) have been finaled in the Third Deese res-

(Continued on page 77)

Two laying barges end to end with supply barge tied up alongside.



Pipe on the laying barges was weld-joined and field molds applied at five working positions.



This view shows two welding positions, one X-ray position, and two mold positions.

Channel Crossing Laid Without Bends For 18-In. Line in Galveston Bay

Sections of concrete-coated pipe were welded on two barges for recent project of Pan American Gas Co.

by F. Lawrence Resen
Gulf Coast District Editor

IN laying Pan American Gas Co.'s 10-mile, 18-in. line across Galveston Bay, pipe was pulled from both banks to the vicinity of the ship channel. A feature of the project was the way that full advantage was taken of the flexibility of concrete-coated pipe so that it was laid in the channel depression without bends by the procedure adopted by the contractor, Brown & Root, Inc.

This bay crossing is part of a 50-mile line from Winnie to Texas City, Tex., to bring stripped gas from the greater Seabreeze area in Chambers and Jefferson counties to industries in the Texas City area.

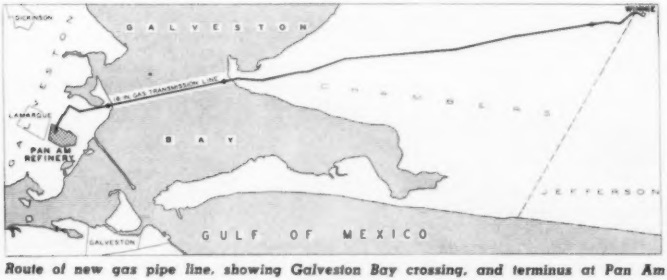
On the laying barges, two welding positions were in use. In the first one the stringer and hot pass were put on. At the second position, the filler and cap were added. This gave a short time between positions for cooling to take place.

At the third position the welds were all X-rayed and a Somastic primer was applied, and in the following position the Somastic field mold was applied.

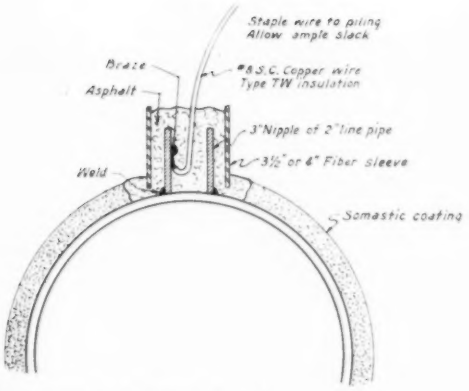
Concrete mold. — The last position was the pouring of the concrete field mold. In this procedure, reinforced concrete was used. Cement was prepared at a 2½-1 mix ratio with 2 lb. of calcium chloride added for each sack of cement to shorten the setting period of the concrete in the mold.

The mold for the concrete was made of 28-gage galvanized iron banded onto the concrete-coated pipe over the field joint which had previously been wrapped with reinforcing. The wire was crimped approximately every 9 in. to space it away from the Somastic coating, roughly midway in the concrete.

Two leaves were formed on the top portion of the sheet iron and the entire mold was filled with cement, after which the leaves were put back into place and banded securely so that wash action from the waves could not affect the wet cement.



Route of new gas pipe line, showing Galveston Bay crossing, and terminus at Pan Am refinery.



(1) Braze #8 wire to 2" pipe nipple.

(2) Remove Somastic from 6" circle by melting. Do not use hammer or chisel.

(3) Weld nipple to Pipeline. Clean and prime, inside and out.

(4) When primer is dry, pour in stages with hot asphalt. Set fiber sleeve after initial pour.

Pan American Gas Co.'s standard Type S lead attachment. Designed by M. E. Parker, consulting engineer.

Cement being poured into concrete field mold at last position on laying barge. Sheet metal prevents damage to wet mold.

Spotted at four positions along the under water line are test lead attachments for use in making frequent cathodic-protection surveys. The entire line will be placed under cathodic protection in the near future, either magnesium anodes or rectifiers.

Laying of line.—In laying pipe in the bay, provisions had to be made for crossing the Houston Ship Channel. Mean depth along the route averages 5-6 ft., but a 40-ft. depth is encountered in the channel itself. Further complications were added because of the heavy ship traffic moving through the channel.

To accomplish the task as smoothly as possible, the following procedure was used:

1. The barges were first moved as close to shore as possible—approximately 2,000 ft—and the pipe was made up and shoved and pulled to shore. Once the shore connection had been made the line was then made up towards the ship channel from both sides of the bay, leaving a gap of 1,700 ft. across the ship channel. The line was laid on the bottom of the bay and will later be jetted to a minimum depth of 4 ft.

2. A trench was dredged to cross the ship channel at a depth of 50 ft., and the slope into the channel itself was so designed that no overbends or underbends were required. Normal flexibility of the pipe permits it to conform to the necessary contours with all natural bends having a radius of 900 ft. or more.

3. A 1,745-ft. section was made up alongside the ship channel. This section had cast-iron river weights added to it in addition to the concrete coating giving it the desired negative buoyancy. In making up the channel section, pontoons were spaced alongside the pipe to give it a negative buoyancy to allow for easier handling and less friction when moving into position.

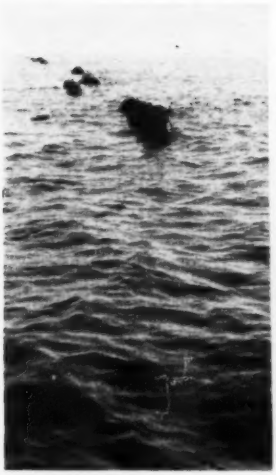
4. The channel section was maneuvered into position and connected to the shore lines and laid in the trench after which the above pontoons were removed. The completed line was subjected to 1,500-lb. test.

Gas service.—Pan Am has entered into a contract with Sun Oil Co. for the purchase of major gas reserves in the greater Seabreeze area. This gas is required by the expansion of plants in the Texas City area and will be distributed to Pan American Refining Corp., Carbide and Carbon Chemicals Division, Republic Oil Refining Co., and Tin Processing Corp. The line not only augments the supply of gas now being furnished but provides for a separate source in the event of emergencies. The line has been designed for a capacity of 110 M.M.c.f. daily without compression from a pressure of 850 psi. at Winnie to 650 psi. at Texas City, which capacity may be greatly increased in the future by intermediate compressors.

Anderson Brothers, Houston, held the contract for laying the land portion of the line. This was a normal pipe-line job using 16-in., ¼-in.-wall pipe with a cold-tar, fiber glass, and felt coating.

Pan American Gas Co. is a subsidiary of Pan American Petroleum & Transport Co.

Sheet-metal molds are being fastened preparatory to moving barge and submerging this section of the pipe line.

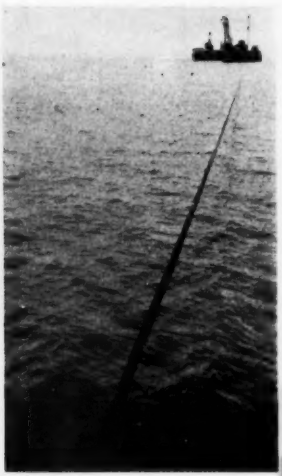


Fastened . . .

View of pontoons showing position of channel-crossing section, while still lying at edge of channel, before pulling into place.

Loose . . .

Use of a cutting torch to detach the pontoons from submerged pipe line, as the pipe-line section is being pulled into channel. The leading pontoon and the one at rear end of section were left in place temporarily to aid lining up.



Pulling . . .

View taken from the pulling barge looking shoreward. This photograph shows the cable connection extending to the anchoring barge.

Questions and Answers on Pan Am's Channel Crossing

In photo, Fowler appears at left; A. C. Golden, who is Pan Am's manager, at right. In the middle, W. D. Schoolcraft, superintendent for the contractors, Brown & Root, Inc., uses a radio telephone to communicate instructions to operators on other barges also engaged on this job.

THE **"Questions"** detailed in this article were put to Pan American Gas Co. by Walter Rose, the Journal's Gulf Coast district editor, Houston.

The "Answers" herewith were furnished by O. W. Fowler, division superintendent of Pan American Gas Co.'s South Texas division since 1947. Fowler, a graduate of Oklahoma University in 1940, has been employed by Pan Am for 11 years.

Ques.: The 18-in. Pan Am pipe-line crossing in Galveston Bay traverses about 10 miles of open water. Why was this line laid from both shores to meet in the middle, instead of continuously from one shore to the other?

Ans.: Galveston Bay in this region has an average water depth of 6 to 10 ft., but is bisected by the 400-ft.-wide Houston Ship Channel where depth ranges from 36 to 40 ft. The large amount of ship traffic in the channel precluded the possibility of laying the pipe there a joint at a time. Moreover, the channel's water depth, and the desire to avoid the use of bends in the pipe line led to the adoption of the scheme where the approaches to the channel were independently laid in a more or less conventional manner. Then the prefabricated center section was pulled into place across the channel (while ship travel was temporarily halted) and tied in.

Ques.: How much time was required for the pulling job?

Ans.: Five hours was scheduled for the operation. Although the pulling job was, in fact, accomplished in just this time, the precaution was taken to get permission to reclose the channel after those ships delayed during the first 5 hours had passed through.

Ques.: Approaches to the ship channel were laid by pulling and pushing off a barge the pipe sections as they were welded together. What were some of the interesting features of this operation?

Ans.: There are about 3.5 miles on the west side of the channel and 6.5 miles on the east side where pipe was laid from barges to form the approaches. This was carried out by first locating pipe barges at a point about 3,000 ft. offshore, and pulling sections by wire-line cable towards the shore, where it connected with the land section of the pipe at a point approximately 1,000 ft. inland from shore line. When this was completed, the remainder of the pipe-line approaches were laid by welding new

The Winch . . .

View of the cable drum on pulling barge showing the wire-line cable extending outward across ship channel, where connection is made with the pipe-line section being pulled into place.

sections to the line, and backing the barge away from the shore and towards the channel.

Not only was Somastic coating applied on the ends of the joints after the welds had been made and inspected, but the reinforced-cement coating at these joints was also applied. The continuous concrete coating is considered a very important innovation for a line of this length. Brown & Root, who were the contractors on this job, and H. C. Price Co., who furnished the Somastic and concrete-coated pipe, achieved a completely coated 10-mile underwater pipe line.

Ques.: What were the negative buoyancy characteristics of these approaches?

Ans.: The pipe weighs about 94 lb. per foot; the Somastic coating weighs about 34 lb. per foot, and the concrete coating weighed, in some cases, 80 lb. per foot and in other cases 100 lb. per foot, depending upon whether or not barium sulfate was added to the cement mix. Sections having 80 lb. concrete coating had a negative salt-water buoyancy of about 45 lb. per foot, while sections having 100 lb. concrete weighed about 65 lb. per foot when submerged.

The heavier 100-lb. concrete coating was employed on a 3,000-ft. portion of the line which formed the western approach to the channel, and on a 5,000-ft. portion which formed the eastern approach. Both of these heavy sections were located about 1,500 ft. from the channel itself, when additional weight was deemed advisable because of the soft bay bottoms. Thus, in resume, the negative buoyancy of the main bay sections was 45 lb. per foot, except for the above-mentioned portions located near the channel which had a negative buoyancy of 65 lb. per foot.

Ques.: In what way were the bay sections of the pipe line connected together with the center sections passing across the deep ship channel, and how were bends avoided?

Ans.: Just before the pipe-line approaches had been completed, the ship channel banks were dredged back approximately 400 ft. to provide for gradual descent of the pipe line to the bottom of the ship channel. The center section itself was prefabricated to a length of 1,745 ft., employing the 80 lb. per foot concrete coating. However, in the middle 800-ft. portion of this section 26 cast-iron river weights, each weighing 2,100 lb., were spaced at 30-ft. intervals, so that as an added safety factor a negative buoyancy in excess of 100 lb. per foot would be obtained. The prefabricated section was capped at both ends so that it would be water tight, and was supported on pontoons at a position on one side of the channel. Enough pontoons were attached to the pipe to decrease the negative buoyancy to about 5 lb. per foot.

Ques.: Since the 1,745-ft. section at this point was in comparatively shallow water it would seem that a tremendous pull would have been required to get the pipe line across the ship channel.

Ans.: This was anticipated, not only by anchoring the pulling barge at its four corners, but also by tying the pulling barge by wire-line cable to another barge, which, in turn, was anchored by seven spuds and connected by cable to an additional anchoring position in a shell reef. However, once the pulling operation was commenced and the pipe started moving out into the channel, it was observed that the anchoring of the pulling barge was sufficient and supplementary anchoring provisions were no longer required. That is, once started, the channel section of pipe pulled relatively easy.

Ques.: What was done with the pontoons?

Ans.: The lead pontoon was left in place as was the pontoon at the tail end of the section. This was because the ends had to be refloated after the pulling job to tie into the pipe-line channel approaches. All other pontoons were removed as they were pulled up to the toe of the cut across the channel. A barge was located at this point. First, the cables holding the pontoons to the pipe would be cut by torch, and then the floated pontoons would be lifted out of the water by crane and stored on the barge for transport back to land.

Ques.: How was the tiein made?

Ans.: This operation was executed in a more or less conventional manner. The ends of the pipe to be joined were lifted out of the water and welded together. After the welds were tested by X-ray, Somastic coating, and then reinforced concrete coating were applied at the joints. Of course, by this time all pontoons had been removed. There remained then simply the job of driving a three-cluster piling marker on each side of the channel to show the pipe-line position. The pipe line was then ready for testing and use.

Ques.: Where were the anode leads attached?

Ans.: Four leads had been provided at points along the Galveston Bay crossing, which could be used for potential surveys to check corrosion data. In the event excessive corrosion is observed, cathodic protection will be installed at these points, or rectifier equipment may be installed on shore. Two of the anode lead sites were selected to coincide with the positions of the channel-crossing piling markers, and the other two were located at points equidistant between the channel and the east and west shores, respectively. It was felt that this arrangement would readily indicate the potential sites of serious corrosion.

Ques.: Do you intend to back-fill the dredged-out approaches to the channel?

Ans.: Army engineer regulations require the cut through the channel spoil bank to be backfilled. On the other hand, the nine or so miles of pipe in the shallow bay waters was jetted down so that the pipe line would be 4 ft. below the bay floor. Other than this, it is assumed that backfilling will not be necessary due to the current action which should shortly cause the ditches to be filled and the pipe to be covered.

Ques.: What sort of block valves were provided?

Ans.: Block valves were installed at each side of the bay crossing at the points 1,000 ft. inland where the 18-in. pipe was connected to the overland 16-in. pipe. Because of the remoteness of the block valve on the upstream side of the crossing, the valve is operated by remote radio control from the terminal station in Texas City. An operator is on duty at this point 24 hours a day observing flow pressures at Texas City and field pressures at Winnie some 50 miles away.

(Continued on page 84)

How to combat

Heat-Exchanger Corrosion

by A. R. Dyer*

Improved methods of cathodic protection and the development of new alloys appear to be the trend in the future struggle against costly corrosion

THE problem of combating corrosion as well as maximum heat transfer, fouling, and the like, is considered when designing the modern heat exchanger. The principal requirement of design is the accessibility of both sides of the tubes for periodic cleaning and removal of scale and deposits. This procedure, of course, not only improves the heat transfer by decreasing the fouling, but also removes the deposits which hold corrosives and galvanic couples against the metal of the tubes. In all exchanger design, the tube bundle should be removable from the shell as a unit.

Another problem of design is choice of materials. As the insides of exchanger tubes are generally more easily cleaned and the tubes more easily replaceable than the shells, it is common practice to rout the medium, which is more liable to leave deposits or which is more corrosive through the tubes.

Tubes in Water Service

In a petroleum refinery, tubes in water service include tube-and-shell condensers and coolers with the hydrocarbon vapors or liquid generally on the shell or outer side of the tubes and water on the inside.

Carbon-steel and admiralty tubes in this service fail by many different types and combination of types of corrosion. The most common types are as follows:

1. Acid condition of the water dissolving the metal—for which water treatment is indicated.

2. Free oxygen in the water, causing oxidation of the iron tube material—defeated by formation of a protective film over the metal, also provided by water treatment.

3. Formation of an algae and oxidation corrosion product on the tube wall, usually with concentration cell pitting beneath tubercles of this coating—water treatment is indicated.

4. Uniform thinning of the tube wall. This type is more pronounced in admiralty tubing due to the formation of soluble salts on the surface which is constantly being swept away, leaving fresh exposed metal in contact with the corrodent. Again, water treatment is indicated.

5. In admiralty tubes—dezincification in which the metal dissolves as an alloy, and spongy copper is redeposited on the tube wall. For defeating this type of corrosion, inhibitors, such as arsenic, antimony, or phosphorous or combination of these are added to the metal during formation of the alloy.

6. Impingement corrosion from rapidly moving cooling water, particularly water containing air bubbles, is found attacking inlet channel tube sheet and tube ends of condensers. Abrasive solid matter, such as sand, carried in suspension also aggravates this condition. Inlet-end corrosion may be defeated by applying protective paint or coating or by inserting plastic or metallic ferrules in the tube ends. A more permanent way of defeating this type of corrosion is by streamlining the inlets in the exchanger channel for eliminating turbulent flow or by cutting velocities.

7. Hot wall effect—characterized by deep pitting on water side of heating or cooling tubes, caused by bubbles of gas separating from the water, causing hot spots at the bubble-to-metal contact points—water treatment indicated for removal of dissolved gases.

8. Stress corrosion cracking—due to residual or applied tensile or cyclic stresses in the tube material. In brass tubes, stress cracking is aggravated by the action of several reagents, particularly mercury or ammonia. On stressed brass material, the cracks follow the grain boundaries. In steel tubes, corrosion-fatigue cracks are found. These cracks are transcrystalline and are usually accelerated by a pitting-type corrosion of the stressed locations.

9. Galvanic action of the problem of dissimilar metals such as are found in many designs of condensers with brass, steel and cast-iron parts on the water side. With a good conducting solution, the larger the cathodic (brass) area, the greater is the corrosion at the anode (iron) area.

Tubes in Steam Service

Carbon-steel tubes are most generally used in a refinery in steam service. Most corrosion in steam systems is due to condensation containing oxygen and carbon dioxide, accelerated by the potential difference between the liquid and gas phases. Other corrosive gases may result from the decomposition of boiler-water solids, but the greatest offenders are the oxygen and carbon dioxide.

Four different methods of corrosion prevention are usually considered when such problems present themselves:

1. Treatment of the boiler feed water so as to minimize the amount of deleterious gases entrained in the steam.

2. Improved design of condensing equipment to minimize solution in the condensate of these entrained gases.

3. Chemical treatment of the condensate.

4. Use of corrosion-resistant metals and alloys.

Tubes in Oil Service

Exchanger tubes in oil service in a refinery are usually used for feed-to-bottoms exchangers, crude-to-circulating reflux, or crude-to-side-stream heat exchange—applications in which hydrocarbons are on both sides; in condensers where hydrocarbon vapors are on one side with water on the other; in heat-medium reboilers where a hot hydrocarbon stream is on the tube side heating a colder hydrocarbon vapor or liquid stream on the outside; in steam reboilers with steam inside the tubes and oil vapors and liquid outside.

The most common corrosives in petroleum oils are the sulfur compounds (particularly hydrogen sulfide), hydrochloric acid, and some organic acids.

According to Speller, sulfur and sulfur compounds have been found to be particularly corrosive in petroleum refining at temperatures above 400° F. However, the usual range of temperature, where this corrosion is particularly active and gives serious trouble, is up above 600° F. in both liquid and vapor phases of petroleum fractions. The accepted theory of this corrosion type is that it is mainly due to action of hydrogen sulfide, most of which is formed by the thermal decomposition of sulfur compounds present in the oil. The use of low and intermediate chromium steel is about the only practical way of defeating this type of corrosion in exchanger tubes—4-6 or 6-8 per cent chrome, ½ per cent moly tubes being the most practical solution.

In lower-temperature equipment, such as in crude still and the like, some corrosive sulfur compounds may be found in the hotter parts of the system. In general, plain carbon-steel exchanger tubes in this type of service show a very slow rate of corrosion.

Another oil side tube corrosion problem, in addition to the principal

(Continued on page 84)

*Richfield Oil Corp., Watson, Calif. Condensation of paper presented at N.A.C.E. meeting, Los Angeles, September 1951.

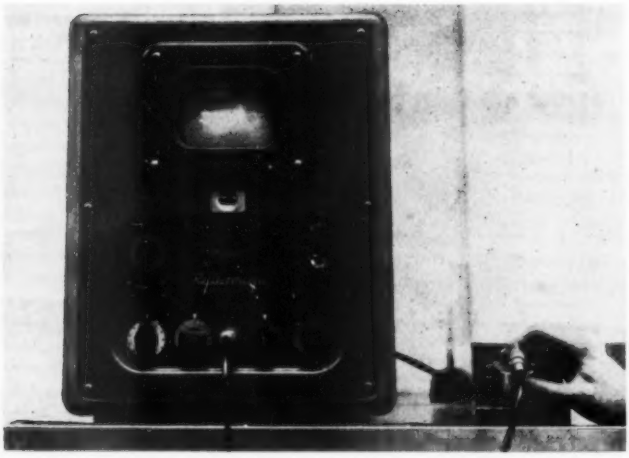


Fig. 1—This instrument utilizes a cathode-ray tube to picture flaws in the equipment under test. The device is applied to the ultrasonic method of testing.

Fig. 2—Using the cathode-ray apparatus in the field to test a vessel shell.

Ultrasonic Equipment Testing

. . . in the petroleum industry

by Dwight J. Evans*

Occurrence of corrosion and erosion in process and other oil-industry equipment requires periodic check of metal thickness. Another inspection problem is that of locating internal flaws. In recent years a number of "nondestructive" inspection methods have been developed. These include principally: (1) radiographic (X-ray and gamma ray), (2) magnetic particle inspection, (3) fluorescent penetrant method, (4) gamma-ray radiation, and (5) ultrasonic methods. This paper deals with the ultrasonic instruments used both for detection of hidden flaws and measurement of metal thickness, as exemplified by the "Reflectoscope" and the "Audigage."

ULTRASONIC testing is not a cure-all for every inspection problem encountered in the oil industry and knowledge of its limitations is a prerequisite to its proper application. However, it has already indicated the way toward savings in down time and in man-hours. While the ultrasonic methods may overlap at times in application with X-ray, magnetic particle inspection, or some of the other methods, each method has its own field of application and often supplements the others.

One type of nondestructive testing instrument is the Audigage, which is based on the ultrasonic resonance principle. This instrument has found wide use in the oil industry for metal-thickness measurement. It is now accepted as a standard inspection tool by many of the larger oil companies. Another type of ultasonic test equipment uses a "pulse" system and shows location of a hidden flaw by projection of an image on a cathode-ray tube. An instrument of this kind is the Reflectoscope which has been employed by the metals and associated industries for about 6 years. During the past year its application has been extended to the specialized problems of the oil industry.

The advantage of ultasonic testing is that periodic checks may be made rapidly, at relatively low cost, and in many cases while equipment is in operation. Skilled personnel are required for making the test and interpreting the data. Some oil companies prefer to purchase ultrasonic instruments and train their own personnel. For others, specialized services are available.

*Engineering Test Service Co., Tulsa

Ultrasonic Detection of Flaws

The Reflectoscope is an ultrasonic test instrument which has only recently been applied to oil-industry inspection problems (Figs. 1 and 2). This equipment has found various applications because of its ability to examine the interior of a material for voids, cracks, laminations, discontinuities in grain structure, etc. An ultrasonic survey for detection of internal flaws, where applicable, can be made rapidly and economically. In some cases, such as determination of large grain structures, unhealed forgings, etc., ultrasonic testing alone provides a means of determining the condition of the interior nondestructively. However, this method of testing is dependent upon the ability of the operator and upon suitable standards. At the present time a subcommittee of the American Society for Testing Materials is setting up standards for ultrasonic testing. The A.S.T.M. has also issued a special technical bulletin on the subject.

Pulse technique. — The Reflectoscope operates on what is known as the "pulse technique," as opposed to the continuous wave generated in the resonance method. The pulse system method is similar in operation to a wartime radar set, except of course that the waves generated are high-

frequency sound waves rather than electromagnetic waves. In the pulsed "single-search unit" method, a short, high-frequency pulse of ultrasonic energy is projected into the material under test, travels through the material, and is reflected from the opposite surface or a defect that it may encounter. Travel time is measured on a cathodic-ray tube, and since the velocity is known, the distance to a defect can be accurately determined. The process is repeated rapidly, and appears as an image with continuous lines and marks (oscillograph) on the cathode-ray tube face.

Straight beam reflection—Figure 3 is a sectional view of an 8-ft. long steel shaft. Ultrasonic energy is generated by the search unit and proceeds through the material until it strikes a reflecting surface. Circle "A" indicates the pattern obtained on the cathode-ray tube when no defect is encountered. Cathode-ray image on the left within the circle is the initial pulse, while image on the right is reflected pulse from the opposite end of the shaft. Small "square wave" markers between the left and right images are adjusted to represent distance. In this case each half wave represents 1 ft.

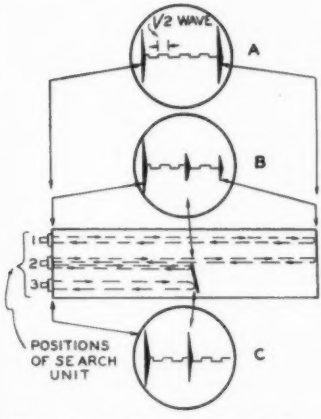


Fig. 3—How a flaw in a long shaft is detected by ultrasonic method of inspection.

"B" indicates pattern obtained when search unit is moved down to a point where a portion of the beam is intercepted by a defect. Indication at right is still back reflection from end opposite that at which search unit is applied, but is reduced in amplitude because a portion of the energy has been diverted. Image in the center of the screen is reflection from defect at approximately 4½ ft.

"C" indicates pattern obtained when entire beam is intercepted by the defect.

A method described as the "two-search unit," or straight-through method may also be used. In this method, a transmitter unit is applied to one side of the material, and a receiver unit is applied exactly opposite. Transmitter and receiver are synchronized, and presentation is on the cathode-ray tube as above.

Angle beam.—In addition to the "straight beam" method of testing described above, an "angle beam" method of testing has also been developed. (Fig. 4). This technique is especially adapted to examining welds in pressure vessels, pipe lines, storage tanks, and so on. It is believed that this method will prove extremely useful in the oil industry. In the angle-beam method, the beam is projected into the material at an acute angle resulting in a shear wave traveling at 45° to the surface to which it is applied. The beam is reflected through a 90° angle upon striking the opposite surface, and thus travels upward at a 45° angle. The beam proceeds through the metal in this manner ricocheting between the two surfaces of the plate. Any discontinuities encountered will reflect a portion of the energy back until it strikes the search unit. It can be seen that the weld can be surveyed throughout, and that position of the defects in the weld can be determined approximately.

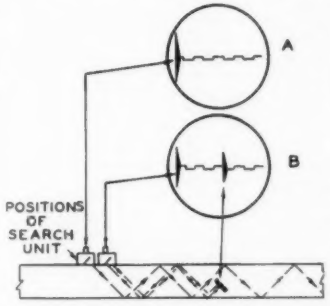


Fig. 4—Schematic picture of how ultrasonic waves locate flaws in vessel wall.

Circle "A" indicates pattern obtained when no defect is encountered, and the beam proceeds through the plate until dissipated. "B" indicates reflection obtained from a small defect. As can be seen from the geometry involved in Fig. 4, the entire thickness of the plate can be surveyed by moving the search unit back and forth a distance equal to thickness of the plate. Since angle of the beam is 45°, the vertical and horizontal distance are therefore equal.

Applications.—The Reflectoscope provides an easy and convenient means of exploring the interior of materials which heretofore has not been available, except with powerful X-ray machines. Large pieces of equipment can be inspected for fatigue cracks while in place, thus making possible savings in dismantling the equipment. One engine manufacturer is now using the instrument for locating fatigue cracks in the interior of piston rods of large compressor engines.

Weld defects.—A recent survey conducted by the author consisted of an examination of welded seams in several large refinery pressure vessels. It was known that numerous defects were present in the seams from previous "trepanned plugs" and repairs, but of course the exact extent was not known. Since a Reflectoscope examination could be made without taking the vessels out of service or removing the contents, it was decided that this method would provide an economical method of determining the exact condition of the welds.

Since it is possible for the apparatus to indicate the presence of very small defects in materials, it was decided to prepare welds with known defect of various sizes, and adjust

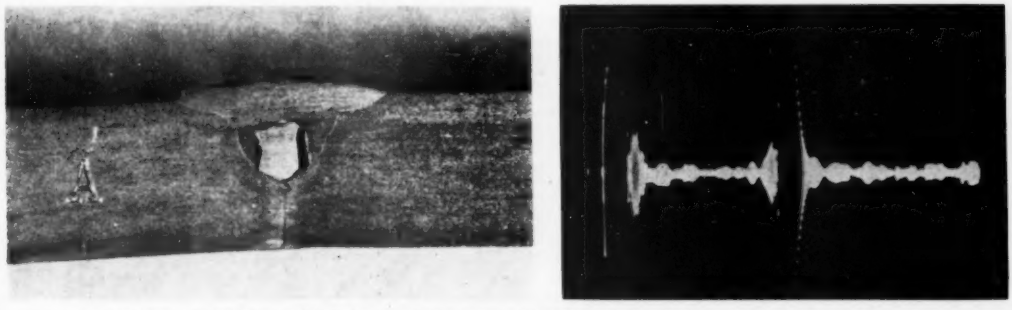
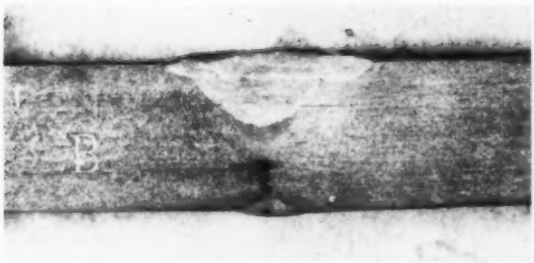


Fig. 5—Left, the defective weld in this especially prepared specimen produced the oscilloscope image shown right.



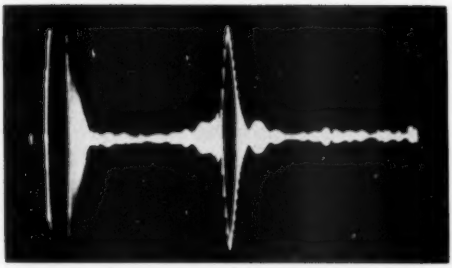
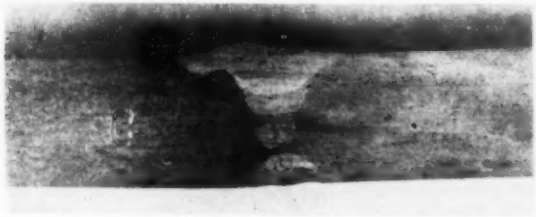


Fig. 6—Left, this defective weld showed up on the cathode-ray tube screen as illustrated, right. Pattern is of less amplitude than that of the defect in Fig. 5.



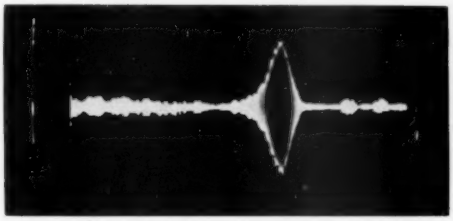


Fig. 7—Left, this weld specimen was prepared especially to include void or porosity. Defects of this type produce bulbous image, right.

sensitivity to a point where the operator could distinguish between weld defects that were large enough to weaken the vessels, and those that were so small that weld quality would not be affected. Figs. 5, 6, and 7 show cross-sectional views of samples prepared to establish the sensitivity setting of the instrument prior to vessel inspection and the corresponding images obtained on the Reflectoscope screen.

Interpretation.—In general the amplitude of the reflection is determined by the size of the defect intercepting the beam. There are, however, many variable factors such as curvature of the defect surface normal to the beam and the angle at which the beam intercepts a flat surface. (The defect, for example, may be round or oval in cross-section or may be a hairline crack located at different angles with respect to the beam). Therefore, unless the orientation of the defect is known (such as a lack of penetration at the root of a weld), the size of the defect cannot be correlated exactly with the amplitude of indication.

However, correlation can be determined within reasonable limits. For example, in some recent weld tests, a 1¼-in. amplitude indication or cathode-ray image was obtained from a 5/16-in. crack resulting from lack of penetration in the weld, and a 1-in. amplitude image from a 5/16-in. hole drilled in the center of the weld, using identical sensitivity settings. A ¼-in. crack would also produce an approximately 1-in. amplitude image and therefore it would become difficult to determine whether the internal flaw is a ¼-in. crack or a 5/16-in. hole. However, a hole will in general produce a bulbous image and the crack a sharp, thin image so that some correlation may be obtained.

Position of defect.—The orientation of a flat reflecting surface can be determined approximately by measuring comparative amplitudes at the two possible angles of beam incidence (the beam traveling downward at a 45° angle from the outside surface, or the reflected beam traveling upward from the opposite surface, as in Fig. 4). The position of the defect inside the weld can also be determined approximately by measuring distance from center line of search unit to center line of weld. This can be checked by measuring from opposite sides of the weld.

Reflections from a rough bead are a source of possible error, but can usually be checked by making the measurements noted in the preceding paragraph. In these tests, sensitivities used were so low that in most cases the effect of the bead was not especially troublesome.

Measuring Metal Plate Thickness

The Audigage measures thickness by determining the frequency at which resonance of the ultrasonic waves occur.[5] It was designed especially for oil-country applications. The present model has been on the market for approximately 2 years and has proved its ruggedness and dependability. The instrument weighs 23 lb. and has a self-contained dry-cell power supply. It can measure steel thicknesses varying from 1/16 in. to 12 in. It is suitable for measuring the thickness of materials such as steel, brass, and aluminum.

Difficulties are sometimes encoun-

(Continued on page 82)

TABLE 1—PIPE CORROSION CHECK POINTS

Reading number and location—	Original specified wall thick. (in.)	Audigage reading (in.)	Micrometer reading (in.)	Per cent variation
1—6-in. overhead line	0.280	0.270	0.265	+1.9
2—4-in. overhead line	0.237	0.225		
3—4-in. overhead line	0.237	0.234		
4—8-in. drawoff line on SE side	0.322	0.320		
5—8-in. return line on SW side	0.322	0.315		
6—16-in. line taken at long bend on bottom of vertical run	0.375	0.345	0.341	+1.1
7—16-in. overhead line taken at bottom of vertical run	0.375	0.320	0.312	+2.5
8—6-in. overhead line	0.280	0.285		
9—4-in. inlet line NE side	0.237	0.30		
10—8-in. outlet line NE side	0.322	0.325		
11—10-in. outlet line on NE side	0.365	0.350		
12—4-in. line from top to exchangers taken at bend of horizontal run just north of tower structure	0.237	0.205	0.200	+2.5
13—16-in. overhead line	0.375	0.405	0.344*	
			0.380†	+4.5
14—4-in. line	0.237		0.225	
15—16-in. line	0.375		0.130	

*Top hole. †Bottom hole.

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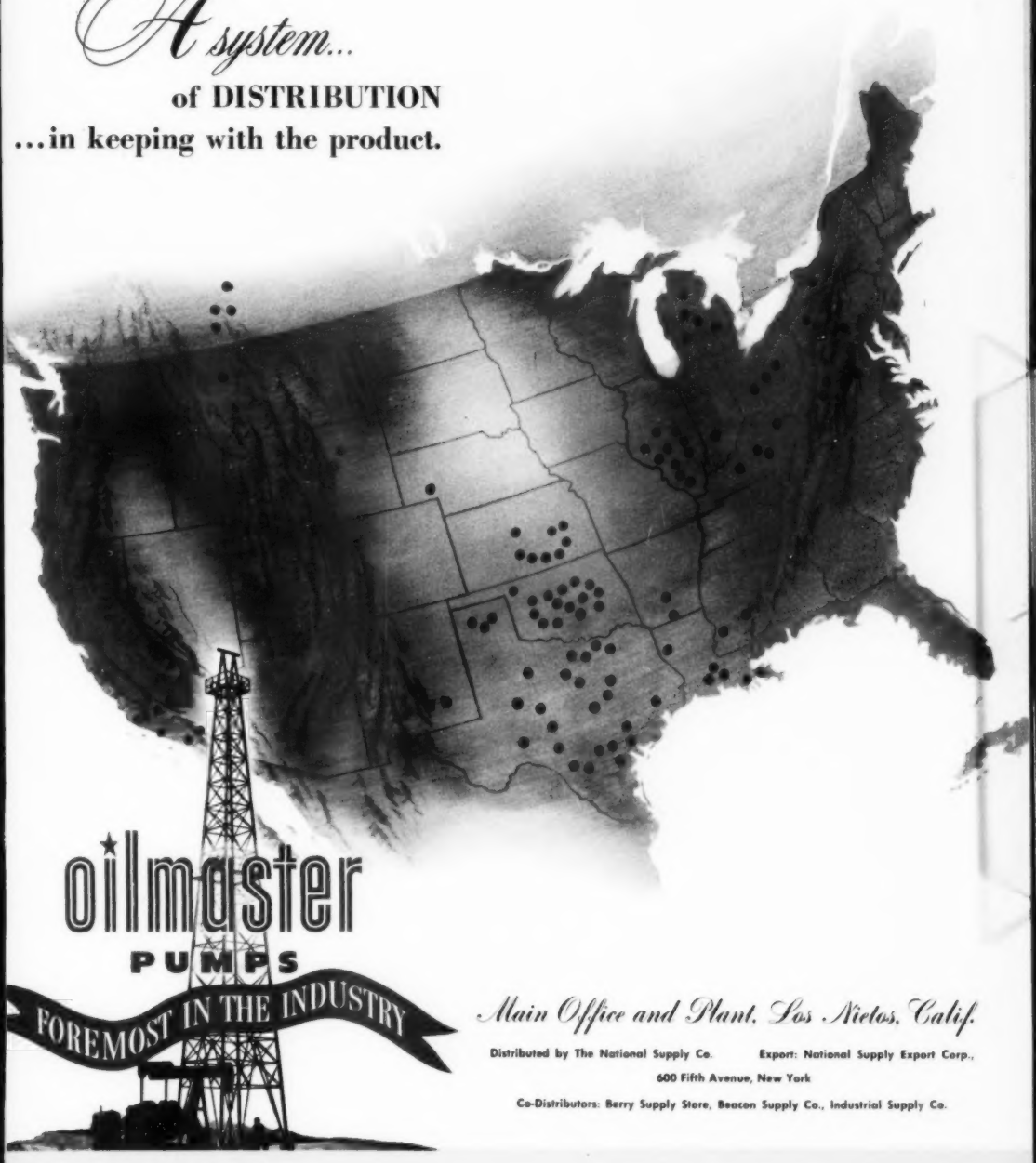

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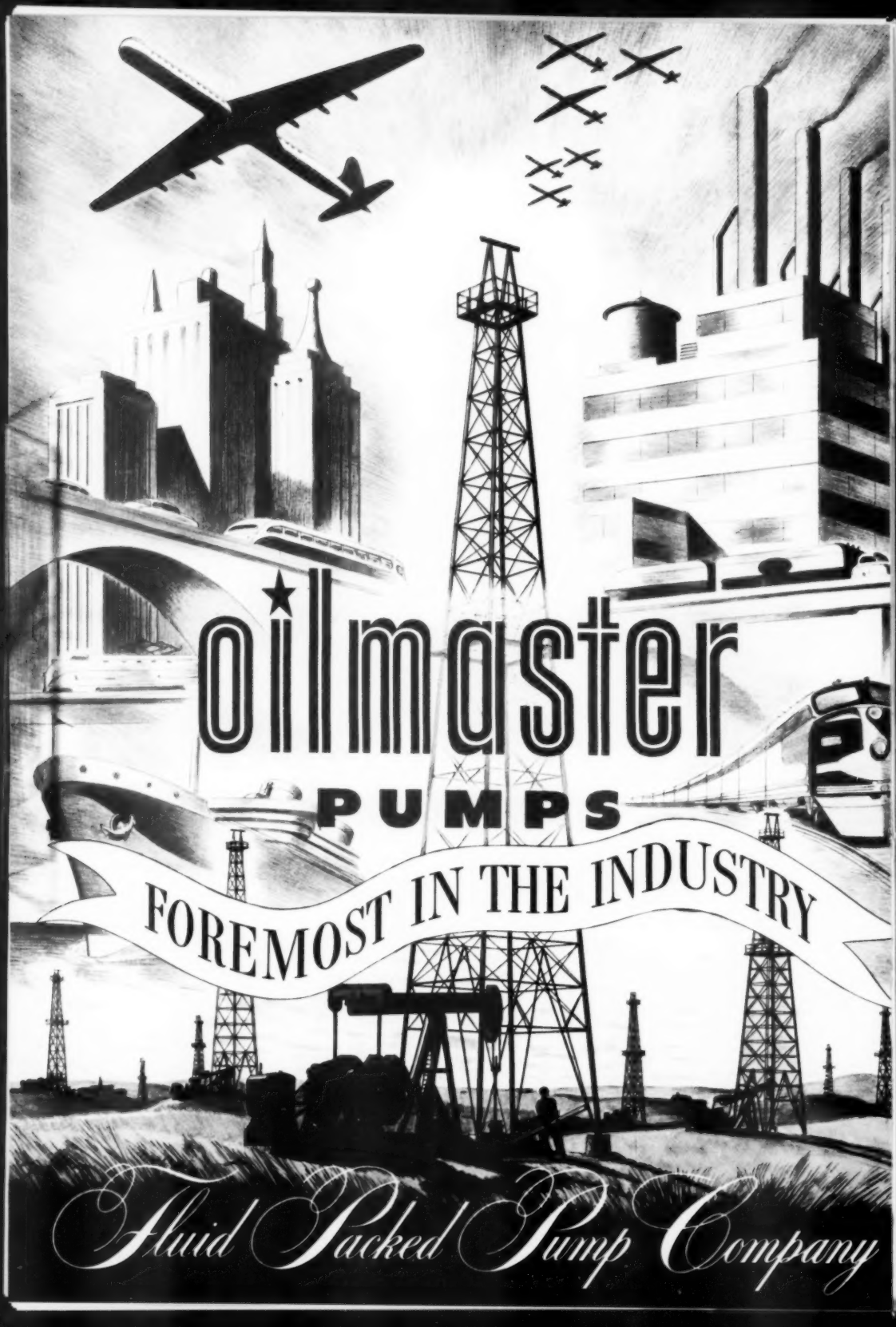
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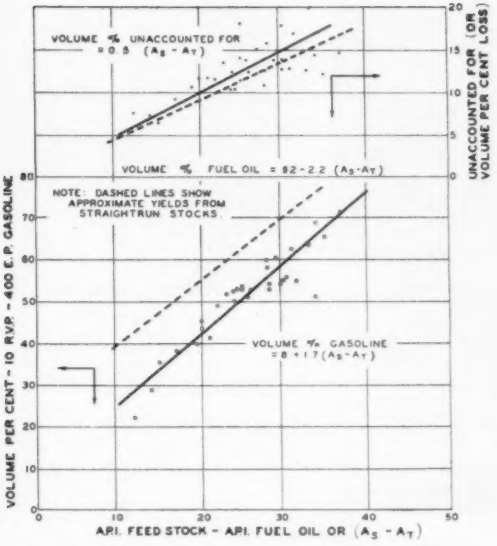

VOLUME % UNACCOUNTED FOR = 0.5 (As - AT)
VOLUME % FUEL OIL = 92 - 2.2 (As-AT)
NOTE: DASHED LINES SHOW APPROXIMATE YIELDS FROM STRAIGHTRUN STOCKS
VOLUME % GASOLINE = 8 + 1.7 (As-AT)
VOLUME PER CENT - 10 RVP - 400 E.P. GASOLINE
UNACCOUNTED FOR (OR VOLUME PER CENT LOSS)
API. FEED STOCK - API. FUEL OIL OR (As - AT)

Fig. 1—Yields in thermally cracked catalytic cycle stocks.

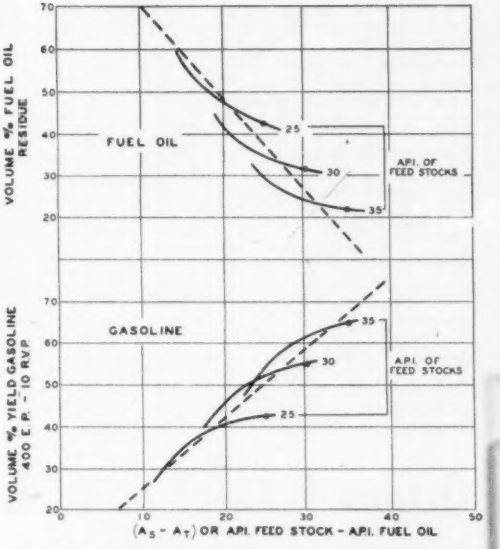

VOLUME % FUEL OIL RESIDUE
FUEL OIL
API. OF FEED STOCKS
VOLUME % YIELD GASOLINE 400 E.P. - 10 RVP
GASOLINE
(As - AT) OR API. FEED STOCK - API. FUEL OIL

Fig. 2—Effect of feed-stock gravity on thermal cracking yields when cracking catalytic cycle stocks.

QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Thermal Cracking of Catalytic Cycle Stocks

We have heard that catalytic cycle stocks are poor charge stocks for thermal cracking, that the yields are low, but we know of no way to estimate the yields. Can you direct us to methods of getting the yields?—F.C.E.

Two excellent papers on the subject of yields have been published, namely, references 1 and 2 at the end of this article. In most ways the analyses of yields given in the references are more complete and exact than those given here, but they are somewhat complicated. For this reason, a correlation has been prepared by a consideration of all available data.

Approximate equations of yields are:

$$\text{Per cent gasoline} = 8 + 1.7\ (A_S - A_T) \quad (1)$$

$$\text{Per cent fuel} = 92 - 2.2\ (A_S - A_T) \quad (2)$$

$$\text{Per cent gas} = 0.5\ (A_S - A_T) \quad (3)$$

in which:

Per cent gasoline = volume per cent 400 e.p. — 10 R.v.p.

Per cent fuel = volume per cent cracked residue.

Per cent gas = volume per cent unaccounted for loss.

A_S = A.P.I. gravity of feed stock (cycle oil).

A_T = A.P.I. gravity of cracked residue.

In comparison, similar equations, when thermally cracking straightrun gas oils or topped crude oils, are:

$$\text{Per cent gasoline} = 24 + 1.5\ (A_S - A_T) \quad (4)$$

$$\text{Per cent fuel} = 75 - 1.95\ (A_S - A_T) \quad (5)$$

$$\text{Per cent gas} = 0.45\ (A_S - A_T) \quad (6)$$

These indicate, as well as the plot of the equations shown in Fig. 1, that the gasoline yields are lower when cycle stocks are cracked than when cracking straight-run stocks. The gasoline yields when cracking cycle stocks are lower (about 63 to 83 per cent). Likewise, the unaccounted-for or gas losses are larger by about 10 per cent when cracking cycle stocks.

The yields cannot, however, be precisely stated by means of linear equations such as Equations 1-6 that have just been stated. The yields are affected by the gravity of the charge stock as well as the difference in gravity of the fuel and the residue. A truer relationship is shown in Fig. 2. The equations indicate that the yield of gasoline is increased by 1.5 to 1.7 per cent for a decrease of one in the A.P.I. gravity of the cracked residue, but Fig. 2 shows that the effect of decreasing the gravity of

TABLE 1—YIELDS BY THERMAL CRACKING OF CATALYTIC CYCLE STOCKS

(Degrees A.P.I.)

A.P.I. of catalytic cycle stock feed	Gasoline yields, volume per cent for these fuel-oil gravities								Fuel-oil yields, volume per cent for these fuel-oil gravities							
	—2	0	2	4	6	8	10	12	—2	0	2	4	6	8	10	12
38	71	70	69	67.5	65.5	63	60	56.5	16.5	17	17	18	19	20	22.5	26.5
36	68	67	66	64.5	63	60	56	51	19.5	20	21	22	23.5	26	28	31.6
34	64	63	62	60	59	56.5	53.5	48	23	23.5	24.5	25.5	27	29	32	37
32	60	59	58	57	55	53	50	45	26	27	28	29.5	31	33.5	37	42
30	56	55	54	53	52	49	46	41	31	32	33	34	36	38	42	48
28	51.5	50.5	49.5	48.5	47	45	42.5	37	34.5	35.5	37	38	40	43	48	53.5
26	46	45.5	44.5	43.5	42.5	40.5	38	33	39	40	41.5	43.5	46	49	53	59
24	40	40	39	38	37	35	33	29.5	43	45	48	51	53.5	57	62	...

the residue is very much less when very low-gravity fuel oils (3° to minus 2° A.P.I.) are produced. The same type of relationship occurs when cracking straightrun stocks *(see "Cracking Low Gravity Stocks," on the July 20, 1950, issue of this page).*

The yields shown in Table 1 on page 75 summarize the yields for cycle stocks ranging from 24° to 38° A.P.I. gravity when cracked for fuel oils in the range of 12° to minus 2° A.P.I. The figures of Table 1 are based on Fig. 2 rather than the simple linear equations.

Selection of a suitable fuel-oil gravity is not difficult because the viscosities of the residues (when cracking cycle stocks) are very low. McReynolds and Barron (Reference 2) indicate that the viscosities of the residues are related to gravity approximately as follows:

A.P.I. of residue	Univ. visc. at 122° F.
0	370
2	250
4	190
6	145
8	115
10	87

These viscosities are very low and even lower than those obtained when cracking straightrun gas oils. Reference 1 does not indicate such low viscosities but it is not anticipated that trouble with viscosity will be encountered.

References

1. Little and Merryfield — High-Destruction Thermal Cracking of Catalytic Cycle Oil, The Oil and Gas Journal, March 29, 1951, p. 242.
2. McReynolds and Barron—Thermal Cracking of Fluid Catalytic Cycle Gas Oils, Petroleum Refiner, April 1949, p. 111.
3. Private cummunications to the author.

Octane Ratings of U. S. Motor Fuel Drop From Record Levels

Survey during summer of 1951 shows slightly lower average

by O. C. Blade*

DURING the summer of 1951 octane ratings of motor gasolines sold in the United States dropped from the record levels attained during the winter of 1950-51. Average octane values of gasolines were one-half to one octane unit below those of the preceding winter and slightly below the octane ratings of motor fuels of the summer of 1950. These conclusions are from recently released data by the Bureau of Mines, United States Department of the Interior.

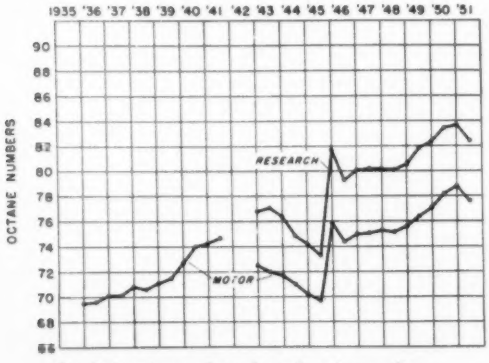
*Associate petroleum chemist, Petroleum Experiment Station, U. S. Bureau of Mines, Bartlesville, Okla. Summary of U.S.B.M. R.I. 4854.

A total of 3,427 samples collected from service stations in 140 locations throughout the country were analyzed for this survey by company laboratories under a cooperative agreement between the Bureau of Mines and the American Petroleum Institute. The samples represent the products of 128 companies, large and small, who manufacture and supply motor gasoline.

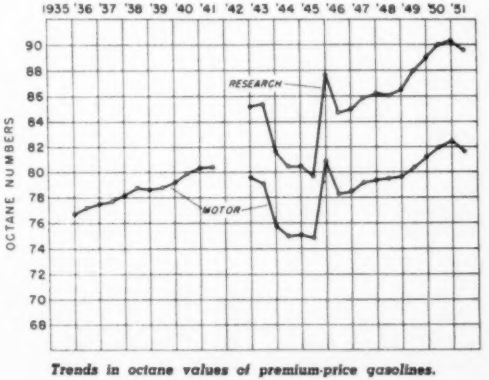
The data have been tabulated by groups according to 17 marketing areas, (districts) into which the country is divided. The report also contains charts indicating the trends of selected properties of motor fuels over a number of years and a map showing the current sampling locations and the districts.

The report shows a summary of the tests made and results for the summer preceding. Trends of certain characteristics over a period of years are also presented graphically.

A copy of the report, R. I. 4854, may be obtained without charge from Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh.



Trends in octane values of regular-price gasolines.



Trends in octane values of premium-price gasolines.

Water-Treating References

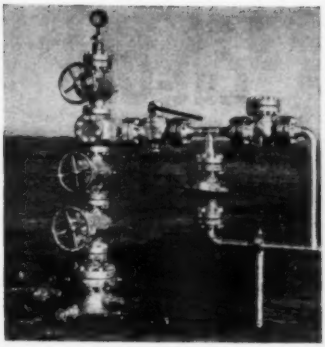
The following references should have accompanied the article, "Here's How to Solve Your Oil-Field-Engine Cooling-Water Problems," by L. C. Case, which appeared in the January 21, 1952, issue of the Journal, page 95.

1. Darrin, Marc, "Chromate Corrosion Inhibitors in Chloride Systems," Ind. and Eng. Chemistry, Vol. 38, No. 4, April 16, 1946.
2. Jewell, A. B., assistant water superintendent, City of Tulsa, personal communication, June 1951.
3. Langelier, W. F., "The Analytical Control of Anti-Corrosion Water Treatment," Jour. American Water Works Assoc., Vol. 28, No. 10, Oct. 1936.
4. Larson, T. E., and Buswell, A. M., "Calcium Carbonate Saturation Index and Alkalinity Interpretations," Jour. of American Water Works Assoc., Vol. 34, No. 11, Nov. 1942.
5. Ryznar, John W., "A New Index for Determining Amount of Calcium Carbonate Scale Formed by Water," Jour. of American Water Works Assoc., Vol. 36, No. 4, April 1944.
6. Wright, Joe R., "Methods for Determining Characteristics of Water Used in Petroleum Industry," The Oil and Gas Journal, issues of June 23, July 14, and September 15, 1945.

BOOKS

NEAR EASTERN CULTURE AND SOCIETY. A Symposium on the Meeting of East and West. Edited by T. Cuyler Young. Published by Princeton University Press, Princeton, N. J. 250 pp. $4.

Here is a broad survey of Arabic-Islamic culture and society in the Near East, written by 11 scholars, each of whom deals with a particular subject. All aspects of Near Eastern society are considered—art, literature, science, philosophy, religion, politics, international relations, and social problems.



Typical well-head installation of injection well at Northeast Elmore.

25 Per Cent More Oil

(Continued from page 64)

ervoir. Twenty-eight dry holes were drilled in outlining the reservoir's productive limits.

Production History

Composite production history for the entire Third Deese reservoir as well as for the original 83-well unit are shown in an accompanying chart. Reservoir performance suggests that this field operates under a primary gas-expansion mechanism. It appears unlikely that there is communication with an aquifer of sufficient size to support an effective water drive.

Productivity index. — During the early development of Southwest Antioch and Katie fields near Northeast Elmore, productivity indexes observed were from 0.3 to 3.2 bbl. per day pound pressure pressure drop.

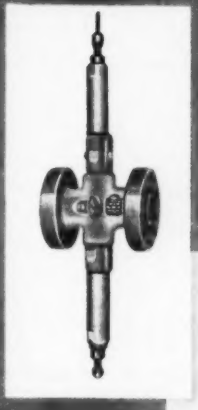
Actual specific productivity indexes of the four best wells in the field ranged from 0.08 to 0.16 bbl. per day per pound per foot.

The calculated specific productivity index of a typical Deese well, with consideration to relative-permeability data, is in fair agreement with the actual specific productivity indexes of those field oil wells which show high oil recoveries. In the foregoing, the productivity indexes range from 0.19 bbl. per day per pound per foot with no free gas to 0.11 bbl. per day per pound per foot at 10 per cent gas saturation.

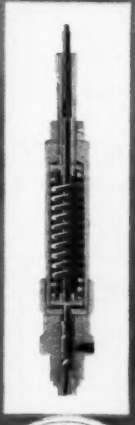
Unitization will improve considerably the conservation of produced gas. Prior to unitization only 4,000 M.c.f. of gas per day was being gathered and sold. The unit has secured a casinghead gas contract to process 11,000 M.c.f. of low-pressure gas daily. Facilities will be provided by the unit to gather the remaining gas volume of 11,500 M.c.f. daily at 500 psig. through a unit-owned system so that all gas production will be utilized.

Thus with the returnable residue from the gasoline plant of 7,500 M.c.f. per day delivered at 500 psig., the unit has approximately 19,000 M.c.f. daily available for operation and gas injection.

Otis Surface Safety Valves



Type A Otis Surface Safety Valve is for flow wings, gathering lines, etc., where a full-opening valve is not required. The self-contained, fully-automatic safety devices are more efficient and more dependable than personal supervision of high-pressure oil and gas wells, and afford 24-hour protection against fire hazards, waste of oil and gas, or damage to nearby property. They instantly shut in the well in case of a line break, freeze-up, or other emergency condition which might cause an increase or decrease in pressure beyond safe or practical limits. The model installed on the well (above) is the Type A with a special pilot fixture for an injection line which activates the safety valve by pressure variations at a point downstream of the surface choke.



Spring in high-pressure pilot holds ball valve closed against thrust of pressure in safety valve chamber. Rise in pressure forces the ball from seat, releasing pressure to atmosphere, closing valve. Low-pressure pilot operates similarly upon drop in pressure in safety valve chamber.

Type X Otis Surface Safety Valve consists of bonnet assembly of high- and low-pressure pilots and packing assembly around stem of full-opening gate valve. Auxiliary pilot assembly for external-pressure operation through line from below choke can be installed on this valve also.

For illustrated bulletin containing complete details, contact

OTIS PRESSURE CONTROL, Inc.

6612 Denton Drive • Box 7206 • Dallas, Texas

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VICTORIA • FALFURRIAS • ODESSA • NEW IBERIA
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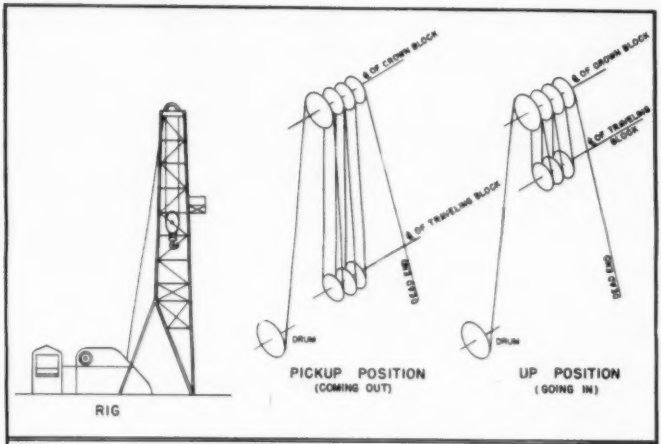
PRESSURE CONTROL OTIS SERVICE EQUIPMENT

"Everything's Under Control"

Cut-Off Practice for Rotary Drilling

(A Proposal)



FOR 87' DERRICK HEIGHT

ROPE DIA. 1" — DESIGN FACTOR 5

DRUM DIA.	NO. LAPS TO CUT-OFF	TON MILES BEFORE EACH CUT-OFF (APPROXIMATE)							
		OKLA. & KANSAS		WEST TEXAS NEW MEXICO		GULF COAST		ROCKY MOUNTAIN	
		1ST CUT ON NEW LINE	ADDITIONAL CUTS	1ST CUT ON NEW LINE	ADDITIONAL CUTS	1ST CUT ON NEW LINE	ADDITIONAL CUTS	1ST CUT ON NEW LINE	ADDITIONAL CUTS
18"	11½	600	500	500	400	600	500	500	400
16"	12½	600	500	500	400	600	500	500	400
14"	14½	600	500	500	400	600	500	500	400
13"	17½	600	500	500	400	600	500	500	400

FOR 66' DERRICK HEIGHT

ROPE DIA. 1" — DESIGN FACTOR 5

DRUM DIA.	NO. LAPS TO CUT-OFF	TON MILES BEFORE EACH CUT-OFF (APPROXIMATE)							
		OKLA. & KANSAS		WEST TEXAS NEW MEXICO		GULF COAST		ROCKY MOUNTAIN	
		1ST CUT ON NEW LINE	ADDITIONAL CUTS	1ST CUT ON NEW LINE	ADDITIONAL CUTS	1ST CUT ON NEW LINE	ADDITIONAL CUTS	1ST CUT ON NEW LINE	ADDITIONAL CUTS
13"	11½	600	500	500	400	600	500	500	400
11"	12½	600	500	500	400	600	500	500	400

FOR 94', 96', & 100' DERRICK HEIGHTS

ROPE DIA. 1" — DESIGN FACTOR 5

DRUM DIA.	NO. LAPS TO CUT-OFF	TON MILES BEFORE EACH CUT-OFF (APPROXIMATE)							
		OKLA. & KANSAS		WEST TEXAS NEW MEXICO		GULF COAST		ROCKY MOUNTAIN	
		1ST CUT ON NEW LINE	ADDITIONAL CUTS	1ST CUT ON NEW LINE	ADDITIONAL CUTS	1ST CUT ON NEW LINE	ADDITIONAL CUTS	1ST CUT ON NEW LINE	ADDITIONAL CUTS
20"	11½	600	500	500	400	600	500	500	400
18"	12½	600	500	500	400	600	500	500	400
16"	14½	600	500	500	400	600	500	500	400
14"	17½	600	500	500	400	600	500	500	400
13"	19½	600	500	500	400	600	500	500	400

FOR 94', 96', & 100' DERRICK HEIGHTS

ROPE DIA. 1⅛" — DESIGN FACTOR 5

DRUM DIA.	NO. LAPS TO CUT-OFF	TON MILES BEFORE EACH CUT-OFF (APPROXIMATE)							
		OKLA. & KANSAS		WEST TEXAS NEW MEXICO		GULF COAST		ROCKY MOUNTAIN	
		1ST CUT ON NEW LINE	ADDITIONAL CUTS	1ST CUT ON NEW LINE	ADDITIONAL CUTS	1ST CUT ON NEW LINE	ADDITIONAL CUTS	1ST CUT ON NEW LINE	ADDITIONAL CUTS
28"	8½	800	700	700	600	900	800	600	500
26"	9½	800	700	700	600	900	800	600	500
24"	9½	800	700	700	600	900	800	600	500
22"	10½	800	700	700	600	900	800	600	500
20"	11½	800	700	700	600	900	800	600	500
18"	12½	800	700	700	600	900	800	600	500
16"	14½	800	700	700	600	900	800	600	500

For the past 3 years, Union Wire Rope Corp., Kansas City, under the direction of C. M. Zerr, chief engineer; R. O. Kasten, director of research; and J. A. Undercofler, district manager at Tulsa, in cooperation with company field men and many major oil companies and drilling contractors, have been conducting a study of cut-off procedures of drilling lines. This to ascertain the ultimate service to be received in ton-miles from drilling lines—a industry-wide problem for some time.

Many different and conflicting ideas prevail on rig floors regarding policies in cutting off. Lengths to cut off vary from 15 to 300 ft., while the ton-miles before cutting off range up to 6,000 ft., depending on the size of the wire rope.

In offering the following proposal to the industry, its authors believe they are making the first steps in the right direction, to the end of helping the contractor to save money on his wire rope. Naturally the last word has not been spoken here, and visual inspections of the wire rope by the operator must take precedence over any predetermined calculations.

The Journal is glad to pass along to its readers this proposal, and invites comment from them.

THE field procedure of cutting off on the drum end of a rotary line has been practiced for many years. In recent years there has been considerable emphasis placed on the necessity of cut off but no standard practice has been forthcoming. If one were to visit the various rigs in the field, he would find many different ideas and policies in cutting off. The lengths to cut off would vary from 15 to 300 ft. while the ton-miles before cut-off may range up to 6,000 depending on the size of the wire rope. None of the operators were able to

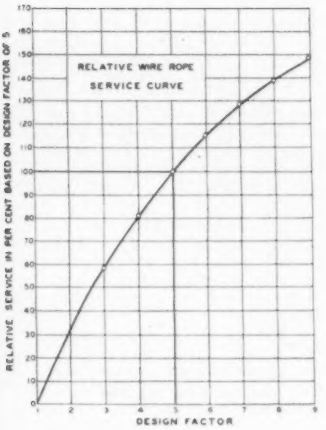


Fig. 1.

state why they cut off a certain number of feet other than they believed that it gave them the maximum wire-rope service.

In determining a cut-off procedure, the factors considered important are (1) **Height of derrick** and (2) **Drum crossover.** These are discussed below:

1. **Height of derrick.**—This determines the distance from the centerline of the traveling block to the centerline of the crown sheaves in the pickup position as well as the same critical distance when going in the hole. It is recognized that the heaviest load is on the wire rope as soon as the grips are removed in picking up or pulling the drill pipe out of the hole. If the wire rope on the drum were not cut off, the relative position of the wire rope in the traveling block and crown-block sheaves would always fall in the

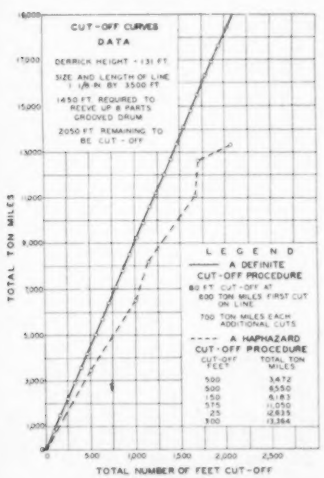


Fig. 2.

FOR 126', 129', & 131', DERRICK HEIGHTS

ROPE DIA. 1⅛" — DESIGN FACTOR 5

DRUM DIA.	NO. LAPS TO CUT-OFF	TON MILES BEFORE EACH CUT-OFF (APPROXIMATE)							
		OKLA. & KANSAS		WEST TEXAS NEW MEXICO		GULF COAST		ROCKY MOUNTAIN	
		1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS
28"	10½	800	700	700	600	900	800	600	500
26"	11½	800	700	700	600	900	800	600	500
24"	11½	800	700	700	600	900	800	600	500
22"	12½	800	700	700	600	900	800	600	500
20"	14½	800	700	700	600	900	800	600	500
18"	15½	800	700	700	600	900	800	600	500
16"	17½	800	700	700	600	900	800	600	500

FOR 126', 129', & 131', DERRICK HEIGHTS

ROPE DIA. 1⅛" — DESIGN FACTOR 5

DRUM DIA.	NO. LAPS TO CUT-OFF	TON MILES BEFORE EACH CUT-OFF (APPROXIMATE)							
		OKLAHOMA		WEST TEXAS NEW MEXICO		GULF COAST		ROCKY MOUNTAIN	
		1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS
32"	9½	1200	1000	1100	900	1300	1100	1000	800
30"	9½	1200	1000	1100	900	1300	1100	1000	800
28"	10½	1200	1000	1100	900	1300	1100	1000	800
26"	11½	1200	1000	1100	900	1300	1100	1000	800
24"	12½	1200	1000	1100	900	1300	1100	1000	800

FOR 133', 136', & 138', DERRICK HEIGHTS

ROPE DIA. 1⅛" — DESIGN FACTOR 5

DRUM DIA.	NO. LAPS TO CUT-OFF	TON MILES BEFORE EACH CUT-OFF (APPROXIMATE)							
		OKLAHOMA		WEST TEXAS NEW MEXICO		GULF COAST		ROCKY MOUNTAIN	
		1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS
28"	11½	800	700	700	600	900	800	600	500
26"	11½	800	700	700	600	900	800	600	500
24"	12½	800	700	700	600	900	800	600	500
22"	14½	800	700	700	600	900	800	600	500
20"	15½	800	700	700	600	900	800	600	500

FOR 133', 136', & 138', DERRICK HEIGHTS

ROPE DIA. 1⅛" — DESIGN FACTOR 5

DRUM DIA.	NO. LAPS TO CUT-OFF	TON MILES BEFORE EACH CUT-OFF (APPROXIMATE)							
		OKLAHOMA		WEST TEXAS NEW MEXICO		GULF COAST		ROCKY MOUNTAIN	
		1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS
32"	9½	1200	1000	1100	900	1300	1100	1000	800
30"	10½	1200	1000	1100	900	1300	1100	1000	800
28"	11½	1200	1000	1100	900	1300	1100	1000	800
26"	11½	1200	1000	1100	900	1300	1100	1000	800
24"	12½	1200	1000	1100	900	1300	1100	1000	800

same place. This naturally would cause severe wear in these places.

By cutting off the rotary line on the drum end, these points of severe wear are moved. However, one must make sure that he does not move the rope the critical distance which would place the rope which was on the fast sheave in the traveling block on the fast sheave in the crown block. If this happened, little would be gained by cutting off. Our cut-off recommendations are shown as a number of laps on the drum which were calculated by laying out the reeving diagram graphically.

Consideration has been given to the traveling block while in the up position going in the hole. The calculated lengths to cut off work nicely when the blocks are in the up position.

2. **Drum crossover.**—This is the point on the drum where the second layer of wire rope crosses over the first layer. Naturally, the third layer crosses over the second, etc. While picking up heavy loads of drill pipe, severe crushing and wear are encountered on the drum where the wire rope crosses over. Therefore, by cutting off approximately the prescribed distance and translating that distance into a number of laps depending on

FOR 142', 143', & 147' DERRICK HEIGHTS

ROPE DIA. 1¼" — DESIGN FACTOR 5

DRUM DIA.	NO. LAPS TO CUT-OFF	TON MILES BEFORE EACH CUT-OFF (APPROXIMATE)							
		OKLAHOMA		WEST TEXAS NEW MEXICO		GULF COAST		ROCKY MOUNTAIN	
		1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS
32"	10½	1200	1000	1100	900	1300	1100	1000	800
30"	11½	1200	1000	1100	900	1300	1100	1000	800
28"	11½	1200	1000	1100	900	1300	1100	1000	800
26"	12½	1200	1000	1100	900	1300	1100	1000	800
24"	13½	1200	1000	1100	900	1300	1100	1000	800

FOR 187' DERRICK HEIGHT

ROPE DIA. 1¼" — DESIGN FACTOR 5

DRUM DIA.	NO. LAPS TO CUT-OFF	TON MILES BEFORE EACH CUT-OFF (APPROXIMATE)							
		OKLAHOMA		WEST TEXAS NEW MEXICO		GULF COAST		ROCKY MOUNTAIN	
		1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS
34"	12½	1200	1000	1100	900	1300	1100	1000	800
32"	13½	1200	1000	1100	900	1300	1100	1000	800
30"	14½	1200	1000	1100	900	1300	1100	1000	800
28"	15½	1200	1000	1100	900	1300	1100	1000	800

FOR 187' DERRICK HEIGHT

ROPE DIA. 1⅜" — DESIGN FACTOR 5

DRUM DIA.	NO. LAPS TO CUT-OFF	TON MILES BEFORE EACH CUT-OFF (APPROXIMATE)							
		OKLAHOMA		WEST TEXAS NEW MEXICO		GULF COAST		ROCKY MOUNTAIN	
		1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS	1st CUT ON NEW LINE	ADDITIONAL CUTS
36"	11½	2000	1800	1800	1600	2100	1900	1600	1400
34"	12½	2000	1800	1800	1600	2100	1900	1600	1400
32"	13½	2000	1800	1800	1600	2100	1900	1600	1400
30"	14½	2000	1800	1800	1600	2100	1900	1600	1400
28"	15½	2000	1800	1800	1600	2100	1900	1600	1400

the drum diameter plus one-half lap, we have moved the point of cross-over on the drum.

Various drum diameters of the draw works are shown in the accompanying tables. These are arranged according to derrick heights and rope diameters. Opposite each drum diameter is shown the recommended number of laps to cut off after a number of ton-miles of work has been done. The number of ton-miles, before cut off, is shown for four districts: Oklahoma, West Texas and New Mexico, Gulf Coast, and Rocky Mountain. The number of ton-miles thereby accrued before cutting off does vary slightly among these four areas. For example, a wire rope should give more ton-miles in the Gulf Coast where the formations are softer and less vibration is encountered with the traveling block. On the other extreme is the Rocky Mountain area, as well as West Texas and New Mexico, where because drilling is very hard and vibration is a paramount factor, the number of ton-miles or service from a rope is reduced.

All of the ton-mile values, before cutting off, were assumed using a design factor of 5. Most of us are aware that this design factor often falls consistently below 5. In those cases a correction factor should be applied, see Fig. 1. If, for example, you are operating at a design factor of 4, then from the table which applies to your derrick, rope size and draw works, multiply the recommended ton-miles, before cut off, by the value in Fig. 1. This would be 80 per cent. Likewise, if one is operating at a design factor above 5, multiply the ton-miles, before cut off, by the factor which would be about 100 per cent. Further discussion on this is covered herein under the heading "Relative Wire-Rope Service Curve."

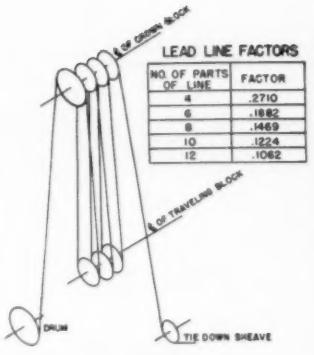

OF CROWN BLOCK
LEAD LINE FACTORS
NO. OF PARTS OF LINE | FACTOR
4 | .2710
6 | .1882
8 | .1469
10 | .1224
12 | .1062
OF TRAVELING BLOCK
DRUM
TIE DOWN SHEAVE
LEAD LINE PULL = WT. OF LOAD × FACTOR
WEIGHT OF LOAD = LEAD LINE PULL / FACTOR

Fig 3.

Drilling conditions in the same territory and on the same rig are not always the same. For an operator to receive the maximum service on a rotary line, he should plot a curve similar to the sample one shown in Fig. 2. Here the dashed-line curve is plotted from an actual field record of ton-miles and cut offs, whereas the solid-line curve is plotted from a definite cut-off procedure. One should increase his rotary-line serv-

TRAVELING BLOCK WEIGHTS
(Approximately)

Capacity (tons)	Weight (lb.)
100	4,500
150	6,500
200	8,500
250	9,500
300	13,500

HOOK WEIGHTS
(Approximately)

Capacity (tons)	Weight (lb.)
60	1,500
125	3,000
200	4,500
300	5,000

DRILL COLLAR WEIGHTS
(Pounds per foot)

O.D. of drill collar (in.)	Bore of drill collar (in.)										
	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	3¾	4
4¼	42	40	37								
4½	48	46	43								
4⅝	51	49	46	44							
4¾	54	52	50	47	44						
5	61	59	56	53	50						
5¼	68	65	63	60	57						
5½	75	73	70	67	64	61					
5¾	82	80	78	75	72	68	64	60			
6	90	88	85	83	79	76	72	68			
6¼	98	96	94	91	88	84	80	76	72		
6½	107	105	102	99	96	92	89	85	80		
6¾	116	114	111	108	105	101	98	93	89		
7	125	123	120	117	114	111	107	103	98	93	84
7¼	134	132	130	127	124	120	116	112	108	103	93
7½	144	142	139	137	133	130	126	122	117	113	102
7¾	154	152	150	147	144	140	136	132	128	123	112
8	165	163	160	157	154	151	147	143	138	133	122
8¼	176	174	171	168	165	161	158	154	149	144	133

ice by plotting a curve of each rotary line and then determine his cut-off procedure such that the curve will approach a straight line. This will give the maximum service he can expect from the rotary line. To arrive at this maximum of service one will have to keep consistent records and follow the cut-off procedure closely. Refer to the discussion under "Cut-off Curve" for additional information.

The information given here is intended to serve merely as a guide to the drilling industry. There are many variables such as shown herein under the heading "General Notes" which we are familiar with, but from present information we cannot differentiate among them. However, **in all cases visual inspections of the wire rope by the operator must take precedence over any predetermined calculations.**

Relative Wire-Rope Service Curve

The curve in Fig. 1 was plotted from experimental test data received from the wire rope fatigue testing machine in the laboratory of Union Wire Rope Corp. Wire rope from the same reel was tested over sheaves of various diameters at design factors ranging from 3 to 9 inclusive. These tests consisted primarily of continued bending over sheaves. On rotary rigs the drum crushing and crossover are severe and will be affected more by the lower design factors.

In the past we have all recognized that considerably less wire-rope service is received when the design factor is reduced. At times little thought is given this problem, but when one inspects Fig. 1, it deserves serious thinking. We have assumed a design factor of 5 (in accordance with A.P.I. Specifications for Wire Rope Standard 9a) to be unity. Now, if the design factor is reduced to 4, one can expect only about 80 per cent of the service he receives at a design factor of 5. Likewise at a design factor of 3 one can expect only about 58 per cent service of a design factor of 5. If one chooses to have higher design factors, he can expect longer service. For example, with a design factor of 7, one can expect about 29 per cent additional service.

Cut-Off Curve

Any wire-rope cut-off procedure is only approximate, and visual inspection of the rope in the field must take precedence over any analytical cut-off method. For comparative purposes let us consider the following rig:

Derrick height—131 ft.
Size and length of wire rope—1⅛-in. by 3,500-ft. 6 by 19 Seale, improved plow regular lay, IWRC, Unionformed.
1,450 ft. required to reeve up eight parts with grooved drum.
2,050 ft. remaining to be cut off.

By using a planned procedure of cutting off 80 ft. after 800 ton-miles on the new line and 80 ft. after 700 ton-miles for each additional cut, a straight line is formed on plotting (see Fig. 3). The dashed line in Fig. 2 was plotted from field data taken from the drilling reports with a cut-off procedure as follows:

Cuts length in feet	Total ton-miles when cut was made
500	3,472
500	6,550
150	8,183
575	11,050
25	12,635
300	13,364

Here the first cut of 500 ft. was not made until 3,472 ton-miles were accumulated. The next cut was 500 ft. and was made after 3,078-ton-miles or a total ton-miles of 6,550. In checking, one notes that few cuts were made but were in sizable length. This procedure does not move soon enough the points of severe wear in the traveling block, crown block, and drum. Consequently, it is mandatory to cut off long lengths to move these points of severe wear entirely out of the reeving system.

For one to get the maximum ton-miles from a rope, the following procedure should be followed. First, one must follow a definite cut-off plan as shown in the accompanying tables. In some instances the ton-miles, before cut off, as shown in these tables may be high or low but represent an average of the field. In either case the operator must assume a definite cut-off procedure and follow it throughout the length providing visual inspection does not indicate otherwise. For example, if one were cutting off 80 ft. after 700 ton-miles of service, and after several cuts had to cut off several hundred feet, it is evident that 700 ton-miles, before cut off, was too high. Then, on the next rope one should try cutting off 80 ft. after 600 ton-miles service. The length of cut off should not be changed, but vary the ton-miles, before cut off. Likewise, if cutting off 80 ft. after 700 ton-miles proves satisfactory, one can try cutting off 80 ft. after 800 ton-miles on the next wire rope, or increase the service until he has reached the maximum.

General Notes

1. More ton-miles can be expected from rigs with large-diameter drums, crown blocks, and traveling blocks.
2. More ton-miles can be expected from grooved drums than from smooth drums.
3. The above ton-miles, before cut off, were calculated for wire ropes made of **improved plow steel wire with an independent wire rope core and unionformed.**
4. Ton-miles, before each cut off, were calculated using a design factor of 5 in accordance with A.P.I. Specification for Wire Rope Standard 9a.

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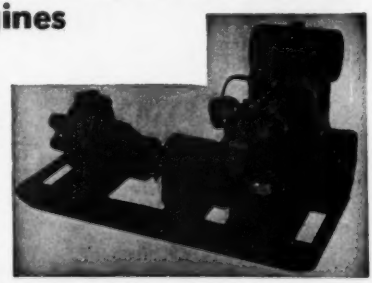

Pumping unit powered by Wisconsin air-cooled engine for circulating oil and tank bottoms. Slow speed of pump eliminates internal agitation and remulsification, it is self-priming, positive and has high suction lift. High tension rotary magneto with impulse starter insures easy starting of engine at lowest temperatures. Engine is free from those parts that cause winter operating troubles such as fan belts, radiator and water pump.

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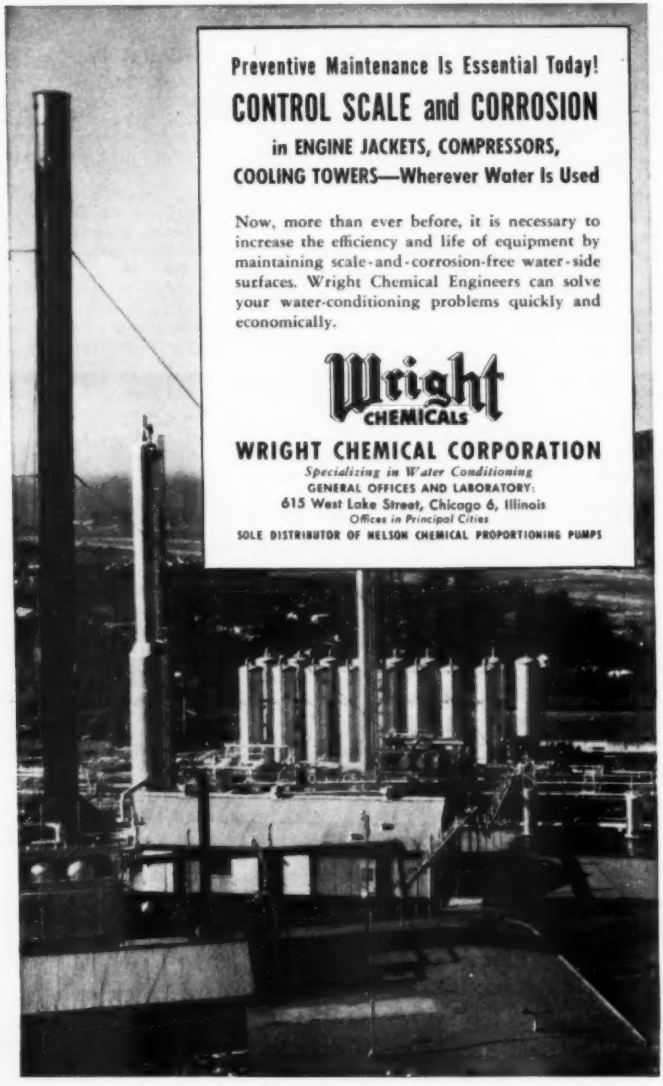
When other design factors are used, refer to Fig. 1.

5. Slipping the dead end of the rotary line through the tie-down sheave at intervals between recommended cutoffs will move the points of severe wear on the wire rope incurred by the traveling and crown block sheaves during the pickup position of the traveling block. When slipping, the total number of feet should be equivalent to the recommended number of feet for cut off. For example, if cutting off 80 ft. every 800 ton-miles, then slip 20 ft. every 200 ton-miles and cut off after the fourth slip, which is 80 ft. at 800 ton-miles.

6. The number of laps to cut off are consistently shown in the accompanying tables as a number plus one-half lap. This will insure a change of the point of crossover on the drum where wear and crushing are most severe.

7. Ton-mile service does not reflect field abuse. When shock loads or other damage as shown in A.P.I. Specification for Wire Rope Standard 9a, Appendix C, is encountered during drilling, allowances must be made for cutoffs and should be noted on the ton-mile record.

8. The ton-miles before each cut-off and the number of laps to cut off are an approximation and serve as a guide to the operator. By following a regular cutting-off procedure, the maximum service from a wire rope can be received. **However, it should be repeated that in all cases visual inspection of the wire rope by the operator must take precedence over any predetermined calculations.**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Ultrasonic Equipment Testing

(Continued from page 72)

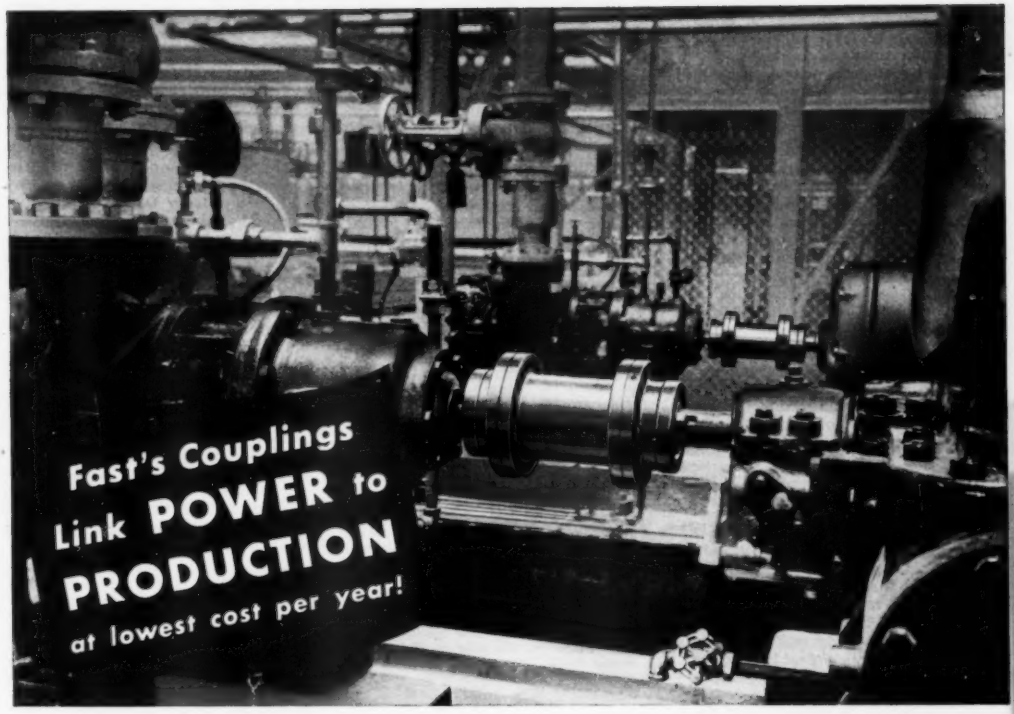
tered in making measurements on cast iron with excessive porosity.

Principle.—The instrument consists essentially of a high-frequency electronic oscillator, a quartz crystal ("transducer") to convert electrical energy from the oscillator into mechanical pressure waves, and a means of detecting the frequency at which a resonance condition is set up in the material. The standard instrument has a frequency range of from 0.65 to 2.00 megacycles.

The pressure waves are beamed into the material from one surface by the crystal, travel through the material at a constant velocity, are reflected at the opposite surface, and travel back to the transducer. Since velocity through a given material is constant, the time required for a wave to make the round trip is a function of the distance traversed, which in this case is equal to twice the thickness. Therefore, if a means of measuring time is available, the thickness can be determined. Since the time interval between successive recurrences of an oscillating frequency is a measure of time, the rate of oscillation can thus be utilized as a timing device.

If frequency is adjusted to a point where a wave is propagated from the transducer at exactly the same instant that the previous reflected wave has arrived back, then a resonance condition is set up, and the time interval between recurring cycles is directly proportional to thickness. This condition is detected by the instrument because of increased power required to drive the oscillator.

Refinery applications.—This instrument is used extensively in determining the extent of corrosion in refinery equipment, and has been helpful in locating hydrogen blisters occurring at laminations as a result of atomic hydrogen seepage.[3] Since measurements can be taken while refinery equipment is in operation, many plants have routine periodic inspections of their equipment, and can obtain data concerning corrosion rates and over-all condition of plant equipment. This practice often results in considerable savings in the time required for plant or unit shutdowns. If temperature of the operating equipment is above approximately 500° F. and thickness measurements cannot be made during opera-



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tion, a much larger number of measurements can be made during the allowed down time, than was possible with older methods such as "drilling and plugging."

Complete and rapid surveys of fractionating towers, other large insulated pressure vessels and piping can be made. In some cases, doubtful areas can be located visually and rapid thickness measurements taken; in other cases, erosion and corrosion occur over wide areas which cannot be located visually, and an over-all survey must be made. Data obtained on a piping survey are given in Table 1.

Oil-field applications.—Use of this equipment has provided substantial savings in the operation of oil-field production equipment. For example, one survey was made on a large number of separators in one of the major oil fields. It was definitely known that corrosion had occurred in some of the separators, but the expense of shutting down the high-pressure well and opening each vessel for examination was prohibitive. Use of the Audigage provided a convenient and inexpensive means for determining the wall thickness and an analysis of interior surface condition, without disturbing the operation of the well or the separator.

Another production problem is the corrosion in high-pressure gas flow lines. This is a problem in cases where condensate is present, and the instrument provides a means of determining the condition of the piping which is otherwise impractical to obtain. The instrument is especially adapted to this sort of field work, since no external source of power is required.

Transportation.—A new application which has recently reached proportions beyond the experimental stage is that of measuring the plate thickness of oil tankers. Corrosion here is a serious problem, since, in general, the cargo alternates between hydrocarbon products and salt-water ballast. The Audigage provides a rapid means of measuring thickness of hull plates, bulkheads, etc., and can do so when the ship is afloat. This method of inspection is often specified by the U. S. Navy in the reconditioning of tankers. The above agency specifies that a number of test holes be drilled as a check on the instrument calibration and ability of the operator.

Signal strength. — Accuracy is not affected by the contents of the pipe or vessel, nor by deposits such as coke or scale. Signal strength will be reduced when such conditions are encountered. (Sound waves are reflected at interfacial surfaces separating two materials that have different acoustical impedances, such as steel and water, for example. The amount of reflected energy, and therefore signal strength, is proportional to the difference in acoustical impedance.) Signal strength is also reduced and broadened when the reflecting surface opposite the crystal search unit or transducer is rough and pitted. In the hands of a skilled operator, the condition of the unseen reflecting surface can be analyzed and classified approximately as being deeply pitted, uniformly corroded, or smooth and untouched.

Limitations.—In addition to the effect that rough and pitted surfaces have in the reduction of signal strength, it is also possible to reach a point where thickness variation is so great that no signals can be obtained. In general when the peak-to-valley depth of pitting exceeds 20 per cent of the total thickness, or if it exceeds one-half wave length (approximately ⅛ in. in steel at one megacycle), it will be impossible to measure thickness.[4,5] This condition is usually not encountered.

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Questions and Answers

(Continued from page 68)

The latter is accomplished by a telemetering system which utilizes a radio signal. Should it be necessary, the operator can close, at a moment's notice, the block valve on the upstream side of the bay crossing. On the other hand, remote control of the downstream block valve on the Texas City side was not considered necessary and therefore not provided.

Ques.: What, in summary, can you say about the success of the Pan Am gas-transmission line crossing of Galveston Bay?

Ans.: While this line has just been completed, and while categorical statements about operational features should be based on some performance history, it can be anticipated that a minimum of trouble is to be expected in the future. The Somastic and cement-coated pipe is expected to give good performance. For example, in the pulling operation the wire-line cable was looped around the cement-coated pipe, and even though the tugging did leave marks, the concrete coating was not cracked or pulled off. The wire reinforcing used for the concrete coating on the pipe and for the concrete coating on the joints evidently gives excellent results.

Another point of importance is the fact that the pipe has a complete covering of concrete coating, with no bare spots at joints. High resistance to marine-life attack of the Somastic coating, therefore, can be expected. Moreover, the weight of the pipe should be sufficient to hold it anchored in place. Should corrosion occur, cathodic protection can be easily installed.

Making the channel crossing without bends is considered to be important. It has been the experience of others who have engineered Galveston Bay crossings that bends are often uncovered and left unsupported by channel currents. Moreover, although comparative cost figures are not available to us, we feel that definite cost advantages can be claimed for the scheme of pipe-line crossing without bends such as we followed.

How to Combat Heat-Exchanger Corrosion

(Continued from page 69)

ones outlined above, is the effect of hot-vapor impingement and condensation in gas oil condensers.

As the usual refinery organic acids are of the oily type, such as the naphthenic and cresylic acids, they also may be considered in this group. Naphthenic acid has been considered an added corrosive along with the sulfur compounds in corrosion problems concerning many crudes.

Although aluminum exchanger tubes have not been used in the Watson refinery of Richfield Oil Corp., others are reported to have done so with considerable success.

Duplex or bimetal tubes may also be mentioned here. These are made by drawing two tubes of different metals one over the other, such as steel outside, against hydrocarbon vapor containing ammonia; with admiralty inside against cooling water.

Improved methods of cathodic protection for defeating corrosion in all types of refinery equipment, as well as in exchangers, and the development of new alloys and outlining of new uses for the existing alloys for the same purposes appear to be the trend in the future struggle against corrosion. Development of new and application of existing protective coatings also will add to the methods of combating corrosion. The solution of heat-exchanger corrosion problems is a challenging as well as a great money-saving job in petroleum refining.

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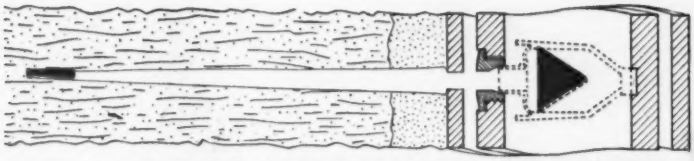

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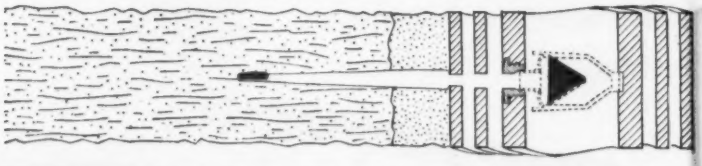

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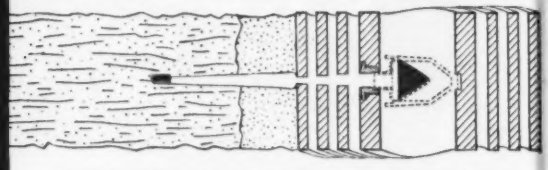

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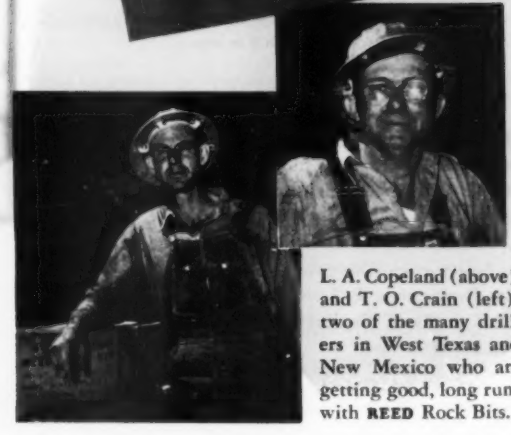

L. A. Copeland (above) and T. O. Crain (left), two of the many drillers in West Texas and New Mexico who are getting good, long runs with **REED** Rock Bits.

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Fig. 120 Extra Short Bit Reamer

Fig. 119 REED Type 38 Short Bit Reamer

Fig. 118 REED Heavy Duty Single 3 Point Reamer, Type 38

Fig. 117 REED Heavy Duty Double 3 Point Reamer, Type 36

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No. 474

Explanations of Flood Behavior

THERE have been several flood mechanisms proposed to explain observed water-flood performance. These will be reviewed below.

First, the typical flood history to be explained will be recounted. Flood histories generally show little water produced in the early life of a flood, the oil production at this time being known as "peak" production, "bank oil," or "primary-phase oil."

Coincident with or shortly after peak production, produced water shows up and continues to increase in amount until the production stream is virtually all water. During this stage oil production is known as "tail-off oil" or "secondary phase oil." The percentage of total oil produced before water appearance may be small or large, and the increase in water-oil ratio after water first appears in the production may be very gradual or very abrupt. The increase in water-oil ratio is, however, generally logarithmic. Fig. 1 gives typical production observations. The items to be explained are, therefore, the amount of oil produced when water first breaks through and the rate of increase in water-oil ratio.

This sequence of produced fluids can be attributed to any of at least three supposed causes. First, the advance of water in all uniform strata may be said to be planar in nature, with no oil produced from a given strata after water breakthrough. The observed flood history can then be said to be a result of the permeability variations within the formation. The production before water breakthrough and rate of increase in water-oil ratio after water breakthrough will depend upon the spread of permeability capacities of the individual strata (see Engineering Fundamentals Nos. 468 and 469).

Second, the advance of water in all uniform strata may be said to give both primary and secondary phases of oil production. That is, each and every stratum, in itself, has flood bank oil up to water breakthrough followed by oil produced by a stripping action. This explanation is based upon relative-permeability data and hence the fraction of oil produced when water breaks through and the rate of increase in water-oil ratio will depend upon the relative-permeability characteristics of the individual strata and the relative viscosities of oil and water. Calculations of advance by this method have been outlined in Engineering Fundamentals 457-462. Now, with this explanation of water advance, it is still necessary to consider that the strata will show their own individual water breakthrough points at different times because of different permeabilities.

Third, it may be said that the first explanation of planar advance in any stratum applies only to systems of linear dimensions and that observed flood history results because practical flooding systems are not linear. In other words flood history can be explained by the pattern of wells chosen for the flooding system. The point of water breakthrough and increase in water-oil ratio will then depend upon the relative length of fluid-flow paths given by the pattern. The relative-permeability characteristics and the ratio of fluid viscosities, as well as the pattern of wells would enter into this explanation of flood history.

It might be noted that according to any of these mechanisms the point of first water breakthrough could vary anywhere from zero oil production to complete oil production, depending upon individual circumstances. However, if the flood history was explained by relative permeability alone or by pattern alone, the ratio of oil viscosity to water viscosity would have to be extremely high to give the low recoveries at water breakthrough which are often experienced. Extremely low recoveries at water breakthrough can be explained entirely by permeability variations alone.

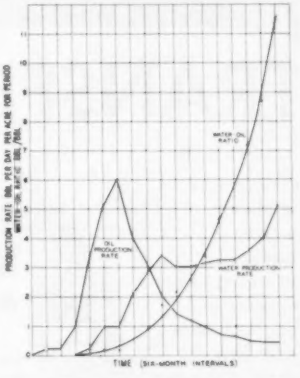

Fig. 1—Typical water-flood history. (Secondary Recovery of Oil in the United States, Second Edition, page 431.)

Not only can these individual hypotheses be used together to explain a given flood performance but each is sufficient to be used separately. Furthermore, since all the variations in flood performance are logarithmic in nature and all explanations are logarithmic it is difficult to say that one explanation fits field data better than another, within observed limits.

It has already been shown that in laboratory floods the relative-permeability explanation comes very close to giving quantitative explanation as well as qualitative explanation.[1,2] However, it is to be remembered that what may look like a low recovery at breakthrough and a slow buildup of water-oil ratio in the laboratory, may on a field basis be a rather sharp water front.

In at least some instances, the supposition that all differences can be explained by permeability variations has led to remarkable agreement between calculated and actual history.[3,4]

Thus, at this time insufficient analysis of field performance and insufficient laboratory tests on flooding combine to make the explanation of field performance uncertain. By any explanation so far proposed, however, the viscosity of the oil compared to the viscosity of the water must be considered. The increase of this ratio will, according to all explanations, tend to lower recovery at time of water breakthrough and decrease the rate of increase of water-oil ratio. By any explanation also, the variation of permeability must be considered as a contributing factor. The weight given to any explanation will vary with the particular situation so that at this time no general criteria can be enumerated.

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4. Suder and Calhoun, Water-Flood Calculations, A.P.I. Drilling and Production Practice, 1949.

Series by John C. Calhoun, Jr., Chairman, Petroleum Engineering School, Penn State College

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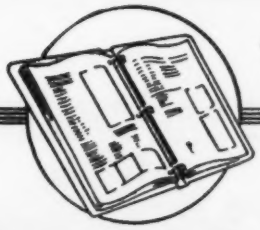


THE REFINER'S *notebook*

No. 108

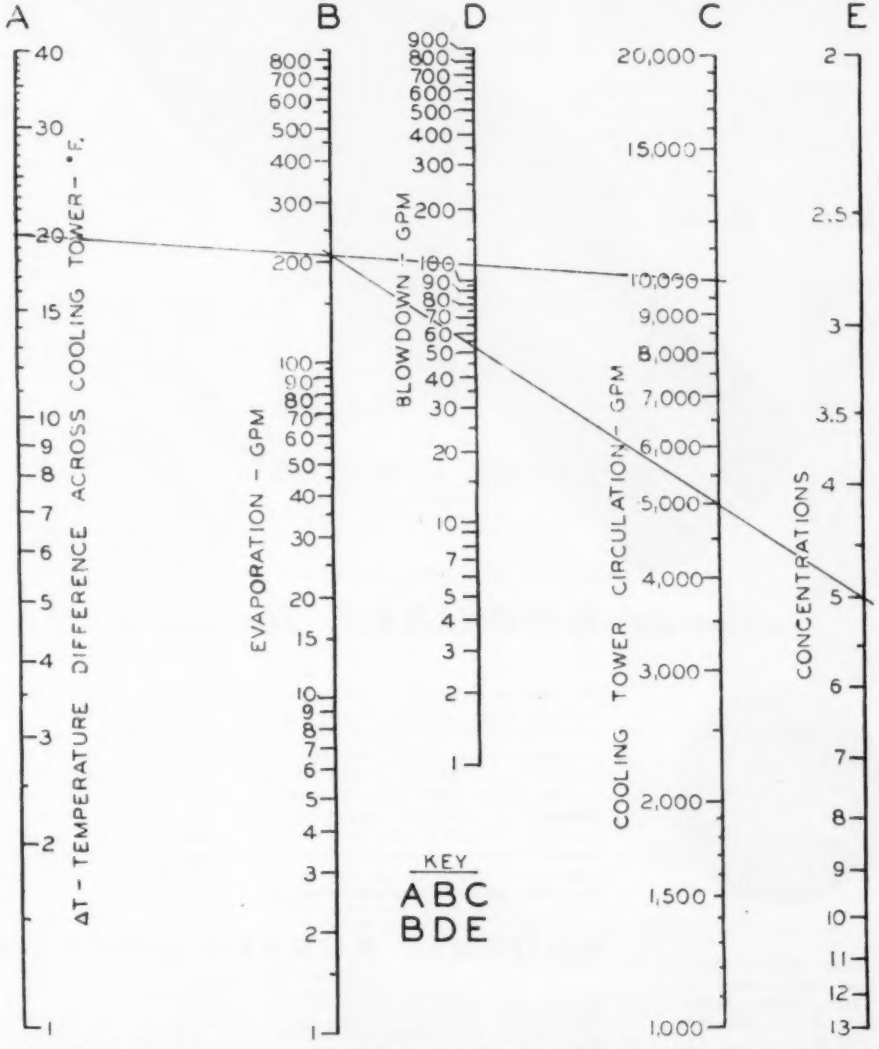
Nomogram for Cooling-Tower Makeup*

A RAPID method for estimating makeup volume and blowdown is given here. In this nomogram Δt (scale "A") is the temperature difference between water entering and that leaving the tower, or the "cooling range."

*Nomogram prepared by Continental Products Corp., 5330 North Grant, Odessa, Tex.

Example: Find the evaporation, blowdown, and makeup volumes for a cooling tower with circulation of 10,000 g.p.m., Δt of 20 and pit concentration of 5.

Solution: Connect Δt on "A" scale with circulation on "C" scale. Read evaporation = 210 g.p.m. on "B" scale. Connect evaporation on "B" with concentrations on "E." Read blowdown = 52 g.p.m. Make-up = evaporation + blowdown = 210 + 52 = 262 g.p.m.



about GOODALL Rotary Hose

Goodall has been FIRST with every worthwhile rotary hose development!

Here are some "eye-opening" facts about Goodall Long-Life Rotary Hose that it will pay you to consider before you make your next rotary hose purchase. First, Goodall is the only rotary hose with the built-in Barney Coupling. It is the only coupling that can be reset to save your hose from the scrap heap. Second, Goodall's flexible cord design has eliminated the cause of more than 90% of rotary hose failures. Next, Goodall Long-Life Rotary hose is strong, flexible, perfectly balanced. In addition, Goodall is the only rotary hose manufacturer that can protect your rotary hose investment with a maintenance plan. And finally, you pay no premium price for the extra quality, long life and high salvage value of Goodall Long-Life Rotary Hose. It costs no more than ordinary hose. So that's why we would like to suggest that you open your eyes to the facts about Goodall Long-Life Rotary Hose. There's none better on the Market!

Attention Goodall Rotary Hose owners: NEVER DISCARD A GOODALL ROTARY HOSE UNTIL YOU CONTACT US.

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OIL AND GAS EQUIPMENT Digest — IT'S NEW — CHECK IT

TRADE LITERATURE

1 UNIVERSAL TRENCHER is an informative sheet pointing out the advantages of this unit which can be used for digging foundations, water and gas mains, service lines, and which has the smooth operation of the wheel type and the vertical advantages of the ladder type. Complete specifications are given. *Universal Trencher Co.*

2 TYPE XA GAS PUMPS is an eight-page bulletin explaining the many uses of these pumps such as delivering gases for processing, removing byproduct gases and vapors, and which maintain fuel pressures for industrial heating. It is profusely illustrated and also includes rating and dimension tables. *Roots-Connersville Blower Corp.*

3 EXPANSION ROOF TANKS. This 18-page illustrated pamphlet discusses single and multiple installations and also explains standard and special fittings. Technical operating data, as well as graph charts on seven types of vapor pressures are included, together with operating and expansion roof analysis. *Graver Tank & Manufacturing Co., Inc.*

4 PNEUMATIC-HYDRAULIC "PG" GOVERNOR FOR PIPE-LINE SERVICE, a technical paper complete with annotated engineers drawings, covers a new concept of governors for engines in pipe-line service. *Woodward Governor Co.*

5 SKID-MOUNTED COMPRESSOR. Bulletin 119 explains the new Clark MA Midget Angle semiportable, self-contained compressor station, with 8¼-in. bore and stroke, available in two, four, six, or eight cylinders, and shipped from the factory completely assembled. *Clark Bros. Co., Inc.*

6 COMBINATION CONVERSION AND DECIMAL EQUIVALENT CHART shows inches converted to feet and metric equivalents on one side, and on the reverse side are shown standard decimal equivalents. Chart is size 17 by 22 in., protected with tin at both top and bottom, ready for hanging. *The Frederick Post Co.*

7 AUTOMATIC REGULATING VALVES. Bulletin 700 features a large cutaway illustration of a typical Spence pilot-operated regulating valve with detailed explanations of five design features. In addition a panel is devoted to showing how the control function of a Spence regulator can be changed by using a different sensitive pilot. *Spence Engineering Co., Inc.*

8 "BOILER SETTINGS WITH PLASTIC AND CASTABLE REFRACTORIES" is a new 24-page catalog and data book containing numerous cross-sectional drawings, charts, technical illustrations, and other data in the field of plastic and castable refractories and their applications in modern boiler settings. It also includes information regarding refractory manufacture, design, and installation. *Ramtite Co., Division of S. Obermayer Co.*

9 MOTOR CONTROL CENTER. A 23-page, illustrated booklet discusses a completely new motor control center for use wherever two or

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more a.c. motors (up to 200 hp., 600 volts) are controlled from a central location, for use in power stations, public buildings, chemical, petroleum, steel, rubber, ore, and other processing plants. *General Electric Co.*

10 THE HEIL CO.'S FIFTIETH ANNIVERSARY CELEBRATION is presented in an attractive booklet which covers company history, policy, facilities, and other details of interest. Full-color illustrations, together with other pictures and product information, are included. *The Heil Co.*

11 PLASTIC RING GASKETS, a loose-leaf bulletin, illustrates and contains useful facts regarding these noncorrosive seal gaskets. *Plastic Engineering & Sales Corp.*

12 TUBING FAILURES IN HIGH-TEMPERATURE AND PRESSURE SERVICE. The many factors affecting tube life in high-pressure, high-temperature applications are presented in a new 40-page illustrated booklet. It displays the history and experience behind contemporary development of high-temperature tubing and will assist those in the field to obtain optimum failure-free service from tubing installations. *Tubular Products Div., The Babcock & Wilcox Co.*

13 CENTRIFUGAL COMPRESSORS FOR INDUSTRY, a profusely illustrated brochure, contains sectional information on compressor applications, installations. Additional information is included on engineering features, and on centrifugal, reciprocating, and absorption refrigerating machines. Sectional drawings are shown. *Carrier Corp.*

14 HYDRAULIC PUMPS, MOTORS, AND TRANSMISSIONS are described and pictured in a six-page loose-leaf bulletin. It also discusses performance data and outstanding features, and shows sectional drawings and dimensions charts on each unit. *Berry Motors, Inc.*

15 BOILING POINTS OF GASES CONVERSION CHART is a 10 by 16-in. attractive and useful wall calendar. Gases from carbon tetrachloride to helium are listed by boiling point in Centrigrade, Fahrenheit, and Absolute scales. *Arthur D. Little, Inc.*

16 VALVES. Bulletin 698 gives engineering and operational information on W-K-M valves, designed for service in refineries and petrochemical plants. Information is included on W-K-M leverlock assembly and expanding gate operation. *W-K-M Co.*

17 METRON TECHNICAL DATA SHEET describes miniature combination fixed and variable-speed drives for use in low-power applications requiring variable speed at a reduced nominal output speed. *Metron Instrument Co.*

18 POWER-THRIFTY PRODUCTS, a four-page illustrated bulletin, shows a line of gears, speed reducers, flexible couplings, and limi-torque valve controls. Types and size ranges are given. *Philadelphia Gear Works, Inc.*

19 IDECO STREAMLINED ROTARIES. A new 12-page multicolored bulletin describes a complete line of streamlined oil-bath rotary tables. Text is supplemented with photographs and exploded views showing working parts and construction details. Other related Ideco products are described. *Ideco Div., Dresser Equipment Co.*

20 PROPER VALVE LUBRICATION is an article reprint which discusses the importance of proper valve lubrication in keeping valves operating at peak efficiency. Also covered are the function, proper selection, methods of application, and the various types of lubricants in general use. *Minneapolis-Honeywell Regulator Co.*

21 PREDICTABLE METERING FLOATS FOR "AREA" FLOW-RATE METERS is a new development which makes it possible to stock meters for immediate shipment. Literature giving full specifications, capacities, sizes, and dimensions of the instruments affected by this development is available. *Fischer & Porter Co.*

22 SELF-ALIGNING BEARINGS AND ROD END BEARINGS are described in a new 16-page engineering catalog. It also gives detailed prints and complete specifications as well as service instructions. Sizes range from ¼ to 3 in. for ultimte loads from 3,000 to 893,000 lb. *Southwest Products Co.*

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OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

by Dan B. Miller

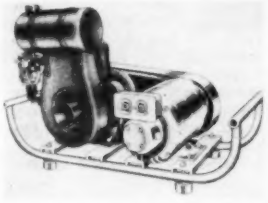
23 ENGINE-DRIVEN SELF-PRIMING CENTRIFUGAL PUMPS. The pump is made up of a check-valve assembly, a tank, a diffuser, an impeller, and a shaft seal. The check valve is conveniently mounted on the outside of the pump. It forms an accessible porthole reaching directly to the pump impeller. The tank is cast in one piece and may be removed by loosening only one circle of bolts. This exposes the working interior parts of the pump. The diffuser is held in place by the tank and can be lifted off the impeller when the tank is removed. It is only necessary to loosen one cap nut to remove the impeller. Only two parts, the impeller and diffuser, can wear and reduce the efficiency of the pump. Both are easily replaced. Both suction and discharge connections are male threaded and hose or pipe connections are made directly to the pump. When the pump is connected, the pump tank is filled with liquid. Priming and repriming operations are entirely automatic. Pumps are available with capacities up to 240,000 gal. per hour. This includes 15 models ranging in size from 1½ to 10-in. Special high-pressure models are also available. Pumps can be changed from base-mounted units to steel-wheel or pneumatic-tire-mounted units without changing the base. Models equipped for burning kerosine or powered by diesel engines are available as stock items. *Marlow Pumps.*

IT'S NEW CHECK IT

24 A NEW GASOLINE-ENGINE-DRIVEN ARC WELDER has the control panel conveniently mounted on the end of the unit at the generator end to centrally locate all controls for easier adjustment of the welding heat. On it are located the generator controls, meters, welding and ground-cable terminals, polarity switch, ignition switch, starter button, oil-pressure gage, and battery ammeter, as well as the receptacle for 1-kw. auxiliary power. Control of the 1,000 combinations of welding current and open-circuit voltage is accomplished by the large wheel and volt-amp. adjuster within the large wheel. The 10 main ranges are selected by means of a heavy copper switch, molded in Bakelite, and operated by the large hand wheel. The generator is powered by a Chrysler industrial engine and includes a standard battery-type ignition, charger, and starting motor. To save fuel as well as wear and tear on the outfit, an idling device is provided to slow the engine down when the arc is broken and bring it up to operating speed when the arc is started. *The Hobart Brothers Co.*

IT'S NEW CHECK IT

25 PORTABLE GAS-ENGINE-DRIVEN ELECTRIC GENERATORS. Model 1,800 in three general ratings 1,000, 1,250, and 1,350 watts at 115 volts, 60 cycles, a.c. They are suitable for many power requirements of contractors, emergency repair trucks, portable power tools, flood lights, and other field work. These generators are rated conservatively and are ruggedly built. They are equipped with sealed ball bearings for long life. The belted construction cushions shock to the generator, reduces vibration, and increases the generator life. The unit is equipped with a universal mounting base and may be purchased completely equipped with engine or may be purchased without an engine. *Wincharger Corp.*



The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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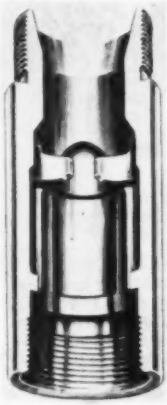
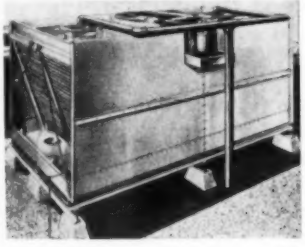
26 NEW CLOSED CAGE increases valve life and contributes to greater pumping efficiency. The cage is in all sizes and is available in Armored and Endurall steel, the latter for corrosive pumping conditions. Design of the cage provides fluid passage through the cage greater than the fluid passage through the seat. The larger radii in the fluid passages increase the strength of the cage and reduce the danger of clogging. All new cages are heat treated. The new design speeds seating and reduces ball spin by directing the full impact of the fluid load on the ball through a center opening in the ball bumper. This faster seating action decreases the lag between the start of the upstroke and the lifting of the fluid in the pump. *D+B Division, Emsco Derrick & Equipment Co.*



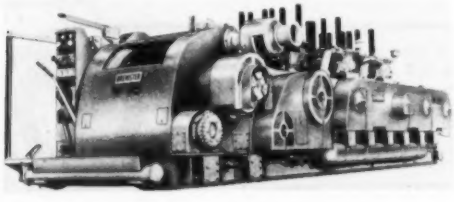
IT'S NEW — CHECK IT

27 DOUBLE-FLOW AQUATOWER is a water-cooling tower for use wherever intermediate capacities of cold water are required. The new tower combines the high efficiency of the Double-Flow design with the compact simplicity of the well-known Aquatower. Outstanding features of the new tower are these: Its height is only 7½ ft. for the 150-ton unit. Pumping head and required fan horsepower are extremely low for any given capacity and design performance. It is the first water-cooling tower in the medium-capacity range to use the patented Double-Flow principle. Tower weight is evenly distributed over a wide area. Aquatower comes in seven standard sizes, starting with a 50-ton unit. It is available in all steel or wood with asbestos-cement board casing. *The Marley Co., Inc.*



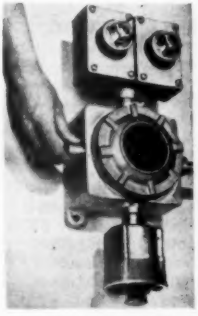
IT'S NEW — CHECK IT

28 N-75 DRAW WORKS for 10,000-ft. drilling incorporates the basic design of the N-7. It has more power, being upped from 600 to 700 hp., and is more ruggedly constructed throughout. A larger diameter and longer drum core has been incorporated to reduce wear on wire lines. Larger chains have been installed on the high and low-drum drives, and an auxiliary positive clutch has been built into the low-drum friction clutch as an added safety feature. The new model has eight line speeds for four rotary speeds available. The transmission has four speeds forward with two in reverse. The height of the drum housing is 62 in. above the main skid floor, allowing the driller a full view of all rig operations. The N-75 is made with either two engines or three engines. *The Brewster Co.*



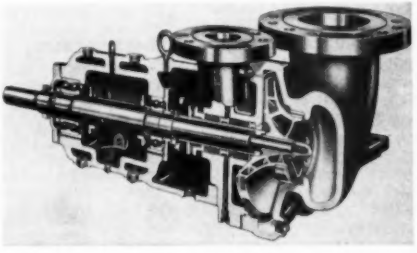
IT'S NEW — CHECK IT

29 COMBUSTIBLE GAS ALARM. Because of its completely explosionproof construction, the new Model EE combustible gas alarm can be installed directly in the suspected atmosphere. Located in a bell-shaped cover housing, the sensing unit is weatherproof like all parts of the unit. By convection and diffusion, the surrounding atmosphere is subjected to a continuous watch against the buildup of any kind of explosive vapors. Presence of such vapor is signaled by a bright red indicator light as well as by remote alarm units of various types which can be connected to the terminals provided. While the standard alarm point is established at 0.2 of the lower explosive limit, other valves can be provided where required. Either self-reset or lock-in arrangements can be provided to give a choice between an on-off indication of gas, or one which must be manually reset. The sensing unit can be located remotely from the rest of the alarm if desired. *Johnson-Williams, Ltd.*

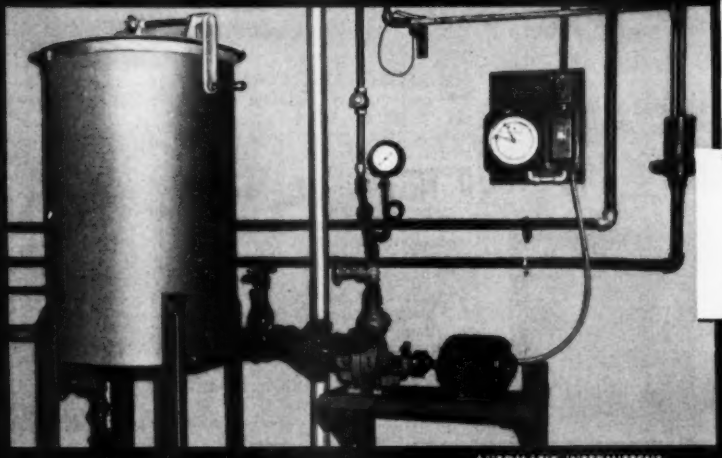


IT'S NEW — CHECK IT

30 TYPE PR-PROCESS PUMP to pump petroleum hydrocarbons, water, and chemical solutions at elevated temperatures and pressures, provides capacities up to 1,000 g.p.m. and operating heads up to 625 ft. Temperatures of liquids pumped can be up to 850° F. Horizontal electric-motor drive is standard but others such as steam turbine or stationary engine can be furnished.



The pump's liquid end can be furnished in cast iron, bronze, carbon steel, stainless steel, or other materials as required. Two models are offered, one with top suction and top discharge, the other with end suction and top discharge. The center-line mount design maintains pump alignment at any temperature. The positive support beneath the pump case prevents strains being imposed on the rotating parts. The vertically split case,



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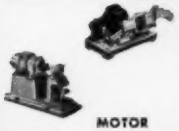

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with single joint, and a fine metal-clad gasket insure tightness against loosening or leaking. *Peerless Pump Div., Food Machinery & Chemical Corp.*

IT'S NEW CHECK IT

31 CHEMKOVERS. New valve and flange covers are designed to provide protection against leakage without hindering normal operation. Made of Dynel, a staple fabric highly resistant to acids and caustics, covers have sufficient strength to contain sprays resulting from gasket or packing failures in pressurized lines. Dynel has inherent qualities which give it the resistant properties desired. It will not support combustion and is easily cleaned. Chem-Kovers require no special tools to install and can be removed easily and quickly when lines require repair. They are designed to fit all styles and sizes of valves and flanges. *Mine Safety Appliance Co.*

IT'S NEW CHECK IT

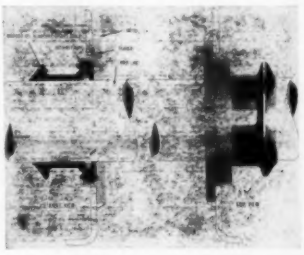
32 2-CUTTER INTEGRAL JET ROCK BITS incorporate the same features that have proved popular with the conventional 2-Cutter rock bit, including the large bearing area; extra-large cutters that have the longest teeth consistent with maximum bearing capacity; and high center construction which assures straight hole regardless of speed and type formation. The Jet bits are made in a complete range of sizes from 8⅜ to 16-in. with either 9/16, ⅝, 11/16, or ¾-in. tungsten-carbide jet nozzles, and are generally furnished in types SS2C, S2C, M2C, MH2C, and H2C. *Globe Oil Tools Co.*

IT'S NEW CHECK IT

33 MODEL 530 TRAILER HEATER. Exceptional high operating efficiency and minimum, simplified service are features of the new oil-fired trailer heater. The new product, specifically for greater capacity for larger coaches, is a compact unit with a B.t.u. output of 27,000. All working parts of the unit are visible and easily serviced. To remove the entire heat chamber assembly simply disconnect the oil line and fuel connection and take out two screws in the base. Similarly, control and tank assemblies are removed by loosening a screw in the control bracket and disconnecting the fuel line. Removal of three screws in the shroud and two screws in the plate behind the shroud will effect disassembly of the power air unit. *Duo-Therm Division, Motor Wheel Corp.*

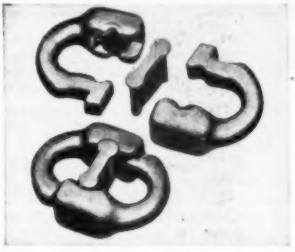
IT'S NEW CHECK IT

34 PB FLEXLINE CONNECTOR is a simple, flexible, and quickly installed connection which allows the use of plain-end pipe for connecting two mud tanks or between the pump suction and a mud tank. It provides positive, leakproof sealing, allows for angular variations as high as 10°, and eliminates the need for spotting tanks the same distance apart on each location. It consists essentially of a steel flange welded to the mud tank, a molded packing element, and a retainer ring. It serves as a flexible joint and absorbs pump pulsation. Settling of pump or tank is automatically compensated for by the angular variation allowed. The self-sealing packing element prevents mud leakage even under extreme misalignment. The Flexline connector is made for 8⅝ and 10¾-in. o.d. pipe. *PB Division, Byron Jackson Co.*



IT'S NEW CHECK IT

35 UNIVERSAL LINKS are stronger than alloy steel chain of comparable size. Only two sizes of Wedglok universal links are needed to connect any size chain from ¼ to ¾-in. depending upon the type of chain used. Thus, distributors and users need not maintain complicated stocks for making chain or wire-rope connections or emergency repairs. Also, Wedglok links permit users to make up chain slings safely from running lengths of chain. They can assemble slings quickly right on the job, without special equipment, to fit exact needs. Other Wedglok links are available in sizes up to 3-in. *Interstate Drop Forge Co.*



IT'S NEW CHECK IT

36 LOW-COST IMO PUMP FOR HIGHER PRESSURES. A new A313B pump, which saves up to 40 per cent in initial cost, is designed to serve a wide variety of oil-handling applications for pressures up to 275 psi. This new rotary positive displacement pump has only three moving parts. It is reliable, quiet, pulsation-free, compact, and is excellent for high-speed operation. It can be used for capacities of 80 g.p.m. pressures to 275 psi., and intermittent pressures up to 325 psi. This new IMO handles light or viscous fluids in hydraulic systems, rotary, and steam atomizing oil burners, lubrication, governing systems, and similar services. *De Laval Steam Turbine Co.*

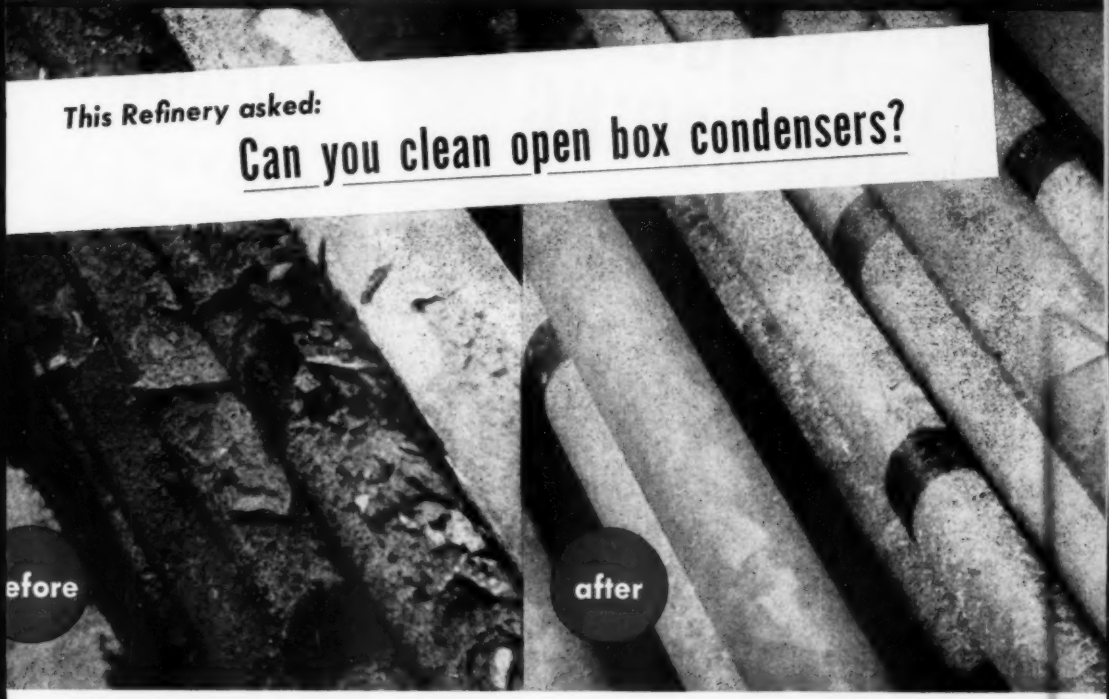
IT'S NEW CHECK IT

DOWELL SERVICE

CHEMISTRY APPLIED TO MAINTENANCE CLEANING PROBLEMS

This Refinery asked:

Can you clean open box condensers?



Dowell Service cleaned *THREE* in 10 hours!

A hard calcium carbonate and iron oxide deposit, $\frac{1}{16}$ to $\frac{1}{4}$ inch thick, had formed on the tubes of three open box condensers in a southwestern refinery. Dowell Service removed an estimated 99% of these profit-stealing deposits, *in just 10 hours.*

Before cleaning, the polymer product left the condensers at 125-140°F. After Dowell Service, the product left at 110°F. with reduced water flow through the boxes. This additional cooling resulted in a 3½% to 4½% increase in polymer yield. The amount of uncondensed gas was reduced by ¼% to ½%.

Dowell engineers successfully cleaned these condensers using special liquid solvents and Dowell-designed pumps and control equipment. The solvents, introduced through regular water connections, penetrated to all parts of the boxes and dissolved and disintegrated the deposits.

Call on Dowell for advice on *your* maintenance cleaning problems. Dowell Service methods are applicable to cleaning many different kinds of refinery equipment *without dismantling and with a minimum of downtime*—for example, condensers, process towers, pipe lines, storage tanks, boilers and cooling jackets. Experienced Dowell engineers will be glad to show you how they can save you real dollars in your plant maintenance program.

Other recent Dowell jobs:

Two comingler condensers in a catalytic cracking plant were cleaned without interrupting operation. Result: Pressure drop across units reduced from 28 lb. to 2 lb.

•

The tubes in four reactor condensers were 85% filled with a wax and oxide deposit, due to unremoved catalyst in the gas oil product. Dowell Service completely cleaned these condensers in 14 hours.

•

Heavy ferrous ferrocyanide deposits built up on the trays and caps of the bubble-cap rectifier column in a catalytic cracking unit. Dowell Service removed this deposit in just 27 hours.

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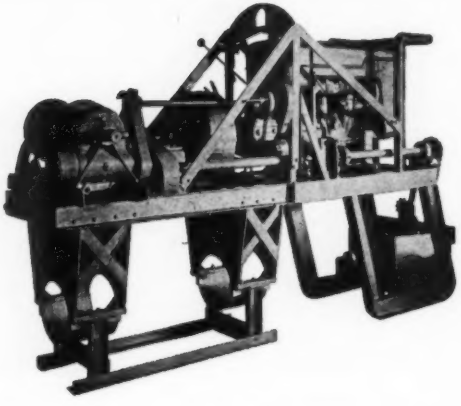

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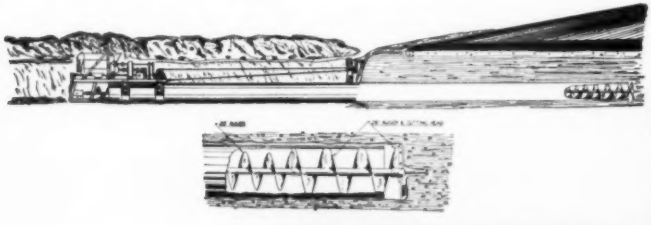

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PIPE LINES

Turn to Power

Central-control systems gaining more recognition

NEW YORK.—Electricity for power, control, and communication is being used more and more in pipe-line operations.

This was the concensus of seven papers presented by nine authors at the winter meeting of the American Institute of Electrical Engineers. J. K. Alfred, assistant area manager of Shell Pipe Line Corp. now on leave with the Petroleum Administration for Defense, introduced the subject with a history of oil-pipe-line development prepared by H. H. Anderson, vice president of Shell Pipe Line *(The Oil and Gas Journal, January 28, 1952, page 407).*

New controls.—Adoption of centralized control of Mid-Valley Pipeline Co.'s pump stations was discussed by C. B. Lester, chief engineer for the firm. Since it has become necessary to adopt the most rigid operating economies in oil-pipe-line operations, the centralized-control system is becoming recognized as a valuable tool in keeping lines at top efficiency, Lester said.

The author discussed two new control devices, believed to be used exclusively by Mid-Valley. The "governor control" is the first attempt to put multiunit diesel engines on stream automatically and smoothly, Lester said. The well-known basic design of Shell's products-pipe-line division has been modified to produce this effect.

"The second item, the 'load-limit controller,' is an attempt to furnish a third signal for electric station-control systems to limit demand during line-packing conditions. Operation of the load-limit controller in effect is to feed a third variable into the two-variable controller used to control the position of the throttle valve in the electric stations.

"Normally this controller holds a maximum discharge pressure or a minimum suction pressure, depending on which happens to be the limited variable at the time. During startup, however, operating into a slack line, these parameters read falsely insofar as the valve is concerned because the setting of their limits into the controller is based on normal, packed, line conditions."

A third device keeps the governor controller from setting the engines in a range of speeds where criticals exist. This device, he said, will be installed in Mid-Valley stations when conditions so require. At present, the line is dispatched and operated so as to keep the engines out of critical-speed ranges.

Development. — The extent to which automatic controls have developed for pipe-line use was outlined by B. M. Mills of General Electric Co.

In automatic motor starters, instrumentation, remote supervisory control, telemetering and communication means (much as telephone circuits and microwave) we have at hand all the tools required for automatic or remote control of pipe-line stations and systems to almost any desired degree, he said. This also includes such auxiliary safety devices as pressure switches, bearing-temperature relays, gas detectors, and the like.

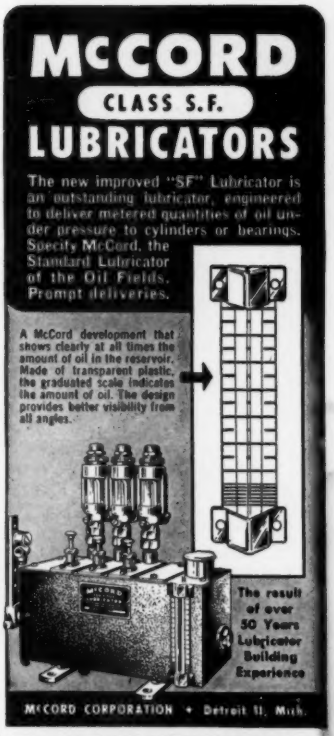
While he did not foresee dispensing altogether with dispatchers and station operators, Mills stated that such automatic control has become a major economic factor in pipe lining, through savings realized with improved system operation, reduction, and simplification of operators' duties, the use of some unattended stations, and quicker adjustment for a change in conditions.

Safety factors. — Merritt A. Hyde, Westinghouse Electric Corp., Pittsburgh, emphasized in particular safety factors involved in designing electrical pipe-line pump stations. Because safety demands the proper selection and installation of electrical equipment to meet atmospheric-hazard conditions involved in the particular station's layout, he said, it is important that from the very inception of the project, the electrical engineer participate in establishing the basic station plan. It is also vital that coordination of electrical features with the other phases of the project continue throughout the design stage. Neglect of this principle has seriously compromised some installations.

New pressure instruments. — A new departure in pressure instrumentation of petroleum pipe lines was reviewed by M. J. Dabney of Plantation Pipe Line Co., Atlanta. Here, new types of electrical pressure-indicating instruments have reduced leaks, minimized corrosion and maintenance costs, and improved measurement accuracy. *(See The Oil and Gas Journal's pipe-line issue, October 4, 1951, page 208).*

United Plans New Line to Gather Mustang Island Gas

WASHINGTON. — United Gas Pipe Line Co., Shreveport, applied last week for a Federal Power Commission o.k. on construction of about 36 miles of line hooking up new gas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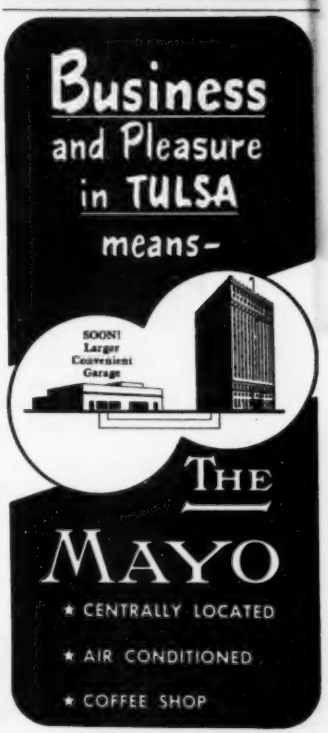

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production in Mustang Island field, near Corpus Christi, with its present transmission system.

The line, estimated to cost $2,735,000, would extend from a proposed metering station for the field, offshore from Ingleside, Tex., to a connection with United's system near Refugio, Tex. Capacity would be about 130,000,000 cu. ft. per day. The company said the gas, to be purchased from Sunray Oil Corp., would be used to supply present customers.

Total proved gas reserves of the field, United said, have been estimated at 1,214.5 billion cubic feet as of November 1, 1951. Reserves in place at the same date under the company's gas-purchase contract with Sunray were 318.6 billion cubic feet.

Plans Near Completion for Cathodic-Protection Course

LIBERAL, Kans.—Plans are being completed for a 2-day cathodic-protection short course to be held here February 18-19.

Arrangements are being made by industry representatives in cooperation with the University of Kansas Extension Center, Garden City, Kans.

The course will be devoted to presentation of fundamentals and applications of cathodic protection of pipe lines and gas wells to field operating personnel. Registration fee for the meeting is $5.

Jay James, Cathodic Protection Service, Tulsa, will be in charge of discussion during the first day. Handling the morning and afternoon sessions during the second day will be Yale Titterington, Standard Magnesium Corp., Tulsa.

New Oil-Radio Facilities Get Construction Permits

WASHINGTON.—Construction permits for 4 base stations and 46 mobile units in the petroleum radio service have been authorized by the Federal Communications Commission, as follows:

1. Pacific Lighting Gas Supply Co., 20 additional mobile units on the West Coast—10 to operate on 153.41 mc. and 10 on 153.47 mc.

2. Salt Lake Pipe Line Co., 16 mobile units in the western United States to operate on 158.37 mc.

3. Texas Illinois Natural Gas Pipe Line Co., one base station on 33.30 mc. near Wharton, Tex.

4. Phillips Natural Gas Co., 10 mobile units to operate on 33.38 mc. in the western United States.

5. Texas Pipe Line Co., three base stations to operate on 153.29 mc. near Loreauville, La.

Cities Service Gas to Add Horsepower, Replace Line

OKLAHOMA CITY.—Cities Service Gas Co. has revealed plans to install

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more horsepower at two of its existing compressor stations in Oklahoma and Missouri and to replace about 15 miles of 16-in. line in Kansas with 20-in.

The program involves the addition of 340 hp. to the company's Welch compressor station in Craig County, Oklahoma, and 1,020-hp. at its Pierce City compressor station in Lawrence County, Missouri.

The larger line would be laid in Montgomery and Labette counties, Kansas. The entire construction, estimated to cost $754,800, would be undertaken to increase capacity of the company's southern trunk line and the Quapaw, Okla.-Springfield, Mo., line.

An application for authority to go ahead with the program has been filed with the Federal Power Commission.

Northeastern Line to Serve New Hampshire by Summer

MANCHESTER, N. H.—A Northeastern Gas Transmission Co. official said recently that the company will kick off on construction of its New Hampshire pipe-line extension as soon as the snow is off the ground this spring.

The New England main will be extended from a few miles north of Lowell, Mass., to serve Nasua, Manchester, and Concord, New Hampshire's principal cities, by midsummer. More than 100,000 consumers in these cities will have natural gas soon after.

E. E. Miller, vice president of Northeastern, said pipe for the extension has been delivered or is scheduled for delivery in time for springtime construction.

Northeastern's line is now complete from the New York state line across Massachusetts to the Atlantic Coast.

Firms Abandon Plans for Sale of Virginia Gas Line

WASHINGTON.—Applications filed with the Federal Power Commission for the sale by Virginia Gas Transmission Corp. of a 30-mile natural-gas line to Lynchburg Pipe Line Co., Lynchburg, Va., have been withdrawn, with FPC approval.

A short supply of gas presently available to Virginia Gas would have made it impossible for the firm to have delivered sufficient gas to take care of the new markets along the route of the 6-in. line, the companies said.

The lateral extends from the main line of Virginia Gas near Lexington, Va., to a connection with distribution facilities of Lynchburg Gas Co. Lynchburg Pipe Line had proposed to acquire the line and sell gas principally to Lynchburg Gas.

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REFINING

El Dorado Refining Begins Work on Plant Expansion

EL DORADO, Kans. — El Dorado Refining Co. has started preliminary work on a $3,000,000 modernization and expansion program at its refinery here.

The program involves construction of a new fluid catalytic cracking unit, revamping and expansion of the crude unit and polymerization plant, construction of a gas-concentration plant, and laying of a new 6-in. crude line to connect with several common-carrier lines southwest of the city.

The new plant will be able to handle cracking stock from 10,000 bbl. of crude per day and will be designed so that capacity can be increased to 15,000 bbl. per day.

Contract for construction has been awarded to Refinery Engineering Co., Tulsa. All facilities are scheduled for completion by January 1, 1953. A certificate of necessity has been issued by the Defense Production Administration authorizing the construction, along with a materials-procurement o.k. from the Petroleum Administration for Defense.

Pan-Am, Tulane Inaugurate Refinery-Practice School

NEW ORLEANS. — Undergraduate chemical engineers at Tulane University will get a first-hand look at problems encountered in petroleum-refining operations during a new industry-training program organized by the university and Pan-Am Southern Corp.

Beginning this week with the second semester, the students will be offered the option during the last half of their senior year to receive on-the-job training at Pan-Am's Destrehan, La., refinery, where special quarters will be provided by the company.

Plans call for the students to be assigned original investigations of a developmental or technical-service nature. The problems will not be routine but those actually confronted in the operation of the refinery.

The school will be under the supervision of Dr. M. M. Gilkerson, assistant professor of chemical engineering at Tulane, who will work with Howard A. Parker, director of Pan-Am's technical department, and other members of Pan-Am's technical staff.

Roy J. Diwoky, executive vice president of Pan-Am, said the company was looking forward to the new affiliation. Progressive industries are recognizing more and more the importance of cooperating with and working with educational institutions, he said.

Shell Chemical Ups Output Of Glycerine, Ethyl Chloride

HOUSTON.—Shell Chemical Corp. has completed installation of new facilities increasing synthetic-glycerine output of its Deer Creek plant by 50 per cent and ethyl chloride production by 30 per cent, according to B. M. Downey, plant manager.

Actual operation at the units began in late 1951, and they now are rapidly nearing scheduled capacity.

Synthetic glycerine, an ingredient

Nelson Refinery Construction Index

Appears in the first issue of each month.
Explanation—Cost-imating No. 61, December 15, 1949, pages 91, 92.
Compiled by W. L. Nelson—Refinery Consultant—Tulsa.
Indexes of Individual Equipment Items—January, April, July, and October

INDEX (1946 = 100)

	1947	1948	1949	1950	Oct. 1951
Centrifugal pumps	109.0	120.0	118.9	128.1	136.2
Reciprocating pumps	128.5	138.1	144.6	143.9	183.3
Compressor	114.0	128.0	120.0	118.8	138.1
Engines	109.0	120.0	115.5	117.9	137.1
Motors	110.0	112.7	114.0	130.8	148.8
Transformers	116.0	116.0	116.0	116.0	130.5
Instruments	113.0	120.0	122.0	127.8	142.4
Miscellaneous equipment ave.	114.2	122.1	121.6	126.2	145.2
Materials component	122.4	139.3	143.6	149.5	163.9
Labor component	113.5	128.0	137.1	144.0	155.1
Refinery construction index	117.0	132.5	139.7	146.2	158.6

in explosives, has been in heavy demand due to growing military requirements. Ethyl chloride is a base material in the manufacture of tetraethyl lead.

Radioactive TEL Developed As Aid to Engine Research

COLUMBUS. — Better antiknock chemicals and internal-combustion engines are foreseen by scientists of Battelle Memorial Institute as a result of their development of the first radioactive form of tetraethyl lead.

While some of the mechanical details of the effects of TEL are known, very little has been determined about what happens chemically.

Battelle scientists substituted an atom of radioactive Carbon-14 for one of the eight carbon atoms in the TEL molecule. This permits tracing of the carbon atoms during the oxidation or combustion of gasoline. Such studies, the researchers say, may indicate the chemical importance of the antiknock agents and in turn aid the development of even better antiknock chemicals.

Carbon-14 is a new radioactive isotope now being produced by nuclear reactors at Oak Ridge, Tenn. A mass of the isotope about 1/16 in. thick would render 1,250,000 gal. of gasoline radioactive enough to detect its presence in a teaspoonful, Battelle says.

Radioactive forms of other petroleum products including propane, butane, and hexane will be prepared soon at the institute in further research aimed at laying the groundwork for development of more efficient internal-combustion engines.

Battelle researchers credited with major roles in producing the radioactive TEL are R. D. Morin, E. J. Kahler, R. L. Belcher, and G. D. Calkins. Their studies have been supported in part by the isotopes division of the U. S. Atomic Energy Commission.

Refining Briefs

The Division of Petroleum Chemistry, American Chemical Society, will meet in Milwaukee March 31-April 3 as part of the society's 121st national meeting. It will conduct a symposium on the "Non-Hydrocarbon Constituents of Petroleum" under the chairmanship of W. D. Seyfried, Humble Oil & Refining Co., Baytown, Tex.

Socony-Vacuum Oil Co., Inc., one of the "old-timers" in the candle business, announced that it has withdrawn from that specialty field and has sold its interests to Will & Baumer Candle Co., Syracuse, N. Y. Included in the sale is the manufacturing equipment at the Paulsboro, N. J., refinery, inventories of "Tavern" brand candles, raw materials, supplies, and the trade name. This decision removes Socony-Vacuum completely from the household-specialties field. The company previously produced an extensive line, including floor wax, furniture gloss, and window cleaner.

Higher price ceilings for high-cost benzene-recovery operations will be allowed by the Office of Price Stabilization. This step, which affects benzene-from-petroleum operations, was made in an effort to increase benzene production by 10 per cent.

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Sharp Drop Recorded in Number of Active Rigs

The normal seasonal slackening in drilling activity at this time of the year, accentuated by unusually severe cold weather and storm conditions in many areas, was reflected by another sharp drop in the number of operating rotary rigs during week ended January 28. Operating rigs in the United States and western Canada totaled only 2,879 at end of that week, 82 fewer than at the same time the previous week, and 181 fewer than at the opening of the year. The number, however, was 664 greater than at the same time a year ago. Only one area, the Illinois-Eastern, reported an increase in drilling. Greatest decline in drilling during the week was on the Gulf Coast, where there were 36 fewer rigs running than a week ago.

ACTIVE ROTARY RIGS*

(United States and Western Canada)

Area—	Week ended 1-28-52	Change week ended 1-21-52	Change week ended 1-29-51
Gulf Coast	592	—36	+ 57
W. & N. Tex.-N. M.	1,027	—16	+309
Ark.-N. La.-E Tex.	180	— 3	+ 45
Oklahoma-Kansas†	493	—23	+ 81
Illinois-Eastern	85	+ 11	+ 14
Rocky Mountains	160	— 5	+ 49
Pacific Coast	169	0	+ 40
Total United States	2,706	—72	+595
Western Canada	173	—10	+ 69
Total	2,879	—82	+664

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the Pacific Coast and Illinois-Eastern areas are shown on pages 128 and 129. †Includes southern Nebraska.

Wofford Drilling Co., Tulsa, has the contract for a projected 7,400-ft. wildcat test which K. A. Ellison will put down in the Kibbey area of southern Harper County, western Oklahoma. Location is on the operator's Cooper lease in the SW SW NE 2-25n-22w.

Rowan Drilling Co., Houston, is starting another deep well in the Venice field, Plaquemines Parish, coastal Louisiana, for Tide Water Associated Oil Co. It is designated as 57 Buras Levee District, with spot location in 22-21s-30e. Hole is projected to 13,000 ft.

Noble Drilling Co., Tulsa, is starting two additional wells for The California Co. in the Coquille Bay field area, Plaquemines Parish, coastal Louisiana. One, 2 State 1785, in 8-19s-18e, is a wildcat 2½ miles south of production and a mile southwest of Grand Bay. It is projected to 11,000 ft. The other, in the field, is 8 State, same lease, in 19-19n-18e. Contract is for 9,600 ft.

Graham Joins Pike

Gene Graham, recently appointed vice president in charge of contracts for Rocky Mountain Drilling Co., Los Angeles, has resigned to join Thomas P. Pike Drilling Co., also of Los Angeles, as assistant to Clyde Simpson, vice president. G. O. Worley, who has been associated with Rocky Mountain Drilling Co. for a number of years in various capacities, has taken over Graham's former duties with that company.

Crow Drilling Co., Shreveport, is drilling a projected 8,600-ft. test for Lyons, McCord & Logan in the Phoenix Lake field, Calcasieu Parish, southwestern Louisiana. It is 1-A DeMary, in 19-11s-13w.

Loffland Brothers Co., Tulsa, has another 12,000-ft. hole under way in the South Tigre Lagoon field, Iberia Parish, coastal Louisiana, where it is drilling for Union Oil Co. of California. Latest operation is 3 Vermilian Bay, in 14-14s-5e.

Penrod Drilling Co., Shreveport, is starting two more tests for H. L. Hunt and associates in the Lismore Landing area, in western Concordia Parish, near the Catahoula Parish line, in eastern Louisiana. One, 2 Lopoo, in 16-1n-7e, is at a wildcat location west of production. The other, 11-E Fisher, in 15-6n-7e, is in the field proper. Both are contracted to 6,500 ft. This contractor also is starting another new operation in the Olla field, LaSalle Parish, two parishes to the west, where it is drilling for Placid Oil Co.

Cooper-Herring Drilling Co., Tyler, Tex., has a rig working for R. E. Moore and associates on a new operation in the Talco field, Titus County, East Texas. Location is for 2 J. M. Belcher, in the George Belcher Survey.

Southern Production Co., Shreveport, has taken on contracts for two additional deep wildcat tests in coastal Louisiana. One, projected to 11,000 ft., will be drilled for The California Co. in the Killona area, St. Charles Parish, at 1 Montgomery, in 85-12s-10e. The other, contracted

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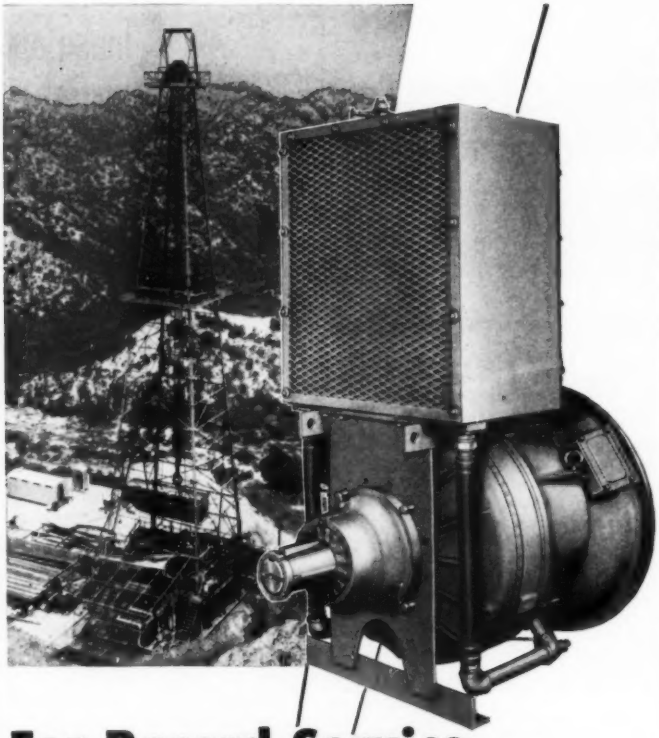

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to 10,500 ft., will be drilled for John L. Loeb in the Kenilworth area, St. Bernard Parish, at 1 State, Lease 1825. In the latter area, **Loffland Brothers Co.**, Tulsa, also has been awarded a contract by the same operator for 14,000-ft. test, 1 Godchaux, in 80-14s-14e.

Regent Drilling Co., Edmonton, is moving a rotary rig to a wildcat location 4½ miles southeast of production in the Wizard Lake area, 30 miles southwest of Edmonton, in Central Alberta Province, Canada, where it will drill 1 LaGuerre for New British Dominion Oil Co., Ltd.

Crow Drilling Co., Shreveport, is starting work on a 4,000-ft. contract which it has with Gulf Refining Co. for a test located in the NE NW NW 36-8n-5w, 2¾ miles southeast of Montgomery, in Grant Parish, Louisiana. The test, 1-A Colfax, will be the second for this contractor in that area, the first, 1 Colfax, being drilled for its own account.

Tiger Drilling Co., Oklahoma City, has contracted with Ashland Oil & Refining Co. to drill a 4,250-ft. test at a wildcat location in the southwest corner of Creek County, Oklahoma. The location, on the operator's Gilbert lease in the NE SE SW 19-14n-7e, is 1½ miles south of oil production between the Vanderslice gas area and the Stroud field, in eastern Lincoln County.

R. W. Rine Drilling Co., Wichita, is drilling a 6,250-ft. test in northwestern Beaver County, Oklahoma, on a contract with Emby Kaye of Tulsa. Location of the test, 1 Sid Sharp, in the C SE SE 31-6n-22eCM, is 3½ miles southeast of the Light gas-distillate area.

E. K. Carey Drilling Co., Denver, is drilling for J. Ray McDermott & Co. at 1 McClelland, a 6,700-ft. Morrison sand wildcat test in 20-5n-59w, northeast of Goodrich, northwestern Morgan County, Colorado.

Creighton Drilling Co., Tulsa, is drilling a projected 3,800-ft. test for C. P. Quinlan at a wildcat location 1½ miles south of the Ravendale gas pool, in northeastern Lincoln County, Oklahoma. Location is in the SE SE NE 4-16n-6e, on the Scott lease.

Helmerich & Payne, Inc., Tulsa, drilling for Amerada Petroleum Corp., has started a deep wildcat test northwest of Norman, Cleveland County, Oklahoma. Location is for 1 Anderson, in the C NW SW 23-9n-3w. In turn, this contractor is having **Warren Drilling Co.**, Tulsa, do the drilling on one of its own wells, 1 Smith, SW SW NE 26-7n-1e, southwest of the recently completed Cat Tail Springs discovery well in the southern part of the same county.

NATURAL GAS

42 Suits Filed to Contest Texas' Gas-Gathering Tax

AUSTIN.—The list of pipe-line firms fighting Texas' new gas-gathering tax in the courts here swelled to 42 before deadline late last month.

The lawsuits, filed in three district courts and a county court-at-law, are an attempt to recover taxes paid under protest since last September when the new levy went into effect.

So far, none of the courts in which suits have been filed has set a date for hearing.

Apparently, the state is now free to release some of the protested tax revenues for spending. Unless those firms protesting payment file lawsuits within 90 days of the respective due dates for the tax, the state need no longer hold up the funds.

Those companies which have paid the tax without protest cannot recover from the state, even if the tax should be declared invalid, unless the legislature should make an appropriation for them. Companies in this group include three of the state's largest: United Gas Pipe Line Co., Tennessee Gas Transmission Co., and El Paso Natural Gas Co.

In November, the last month for which tabulations are available, protested payments totaled $561,461.55 from 77 gas gatherers, and $409,126.59 was paid without protest by 117 companies. Colder weather increased the total take during the month to $970,588.14 against $921,227.44 in October.

Texas Eastern Contracts for West Hamshire Field Gas

HOUSTON.—Texas Eastern Transmission Co. has signed a contract to purchase 26,000,000 cu. ft. of gas per day from West Hamshire field in Jefferson County, Texas.

The agreement, negotiated with Meredith, Clegg & Hunt, provides for initial payment by Texas Eastern of 10 cents per M.c.f. of gas and an annual price increase of .2 cent.

Gas reserves of West Hamshire, a 12,000-ft. field, have been estimated at 250 billion cubic feet, making the field one of the largest in Texas.

The contract reportedly contains a clause providing that it shall become valid only on approval by the Office of Price Stabilization. OPS sanction is needed since the operators are now selling about 20,000,000 cu. ft. of gas per day for 9 cents per M.c.f. First deliveries of gas are to Texas Eastern scheduled for November 1, 1952.

Reports have it that gas now being delivered to present customers will be delivered to Texas Eastern, if the 10-cent price is approved. The pipe-line firm would pick it up from absorption plants of McCarthy Chemical Co. where it is processed. Little additional pipe-line construction would be required, since McCarthy operates a gathering system to the field and Texas Eastern has a line in the vicinity.

Gas Sales Up in November

NEW YORK.—Sales of natural gas during November 1951 totaled 4,076 million therms, a gain of 27.7 per cent over the 3,192 million therms sold in the same month in 1950, the American Gas Association has reported.

The association's index of natural-gas sales during the month stood at 362.9 per cent of the 1935-39 average. For the year ended November 30, 1951, sales totaled 44,185 million therms, up 17.4 per cent over the same period a year earlier.

Sales of manufactured and mixed gas totaled 272.4 million therms, a gain of 5.8 per cent over November 1950.

Natural Gasoline

Expanded Stanolind Plant To Go on Stream This Month

ULYSSES, Kans.—Stanolind Oil & Gas Co. will place new facilities in operation at its Stano gasoline plant near here about the middle of this month which will nearly triple plant capacity.

D. M. Liles, plant superintendent, said the expanded plant will be able to process 325,000,000 cu. ft. of gas per day. The original facilities, which began operation early in 1949, had a capacity of 125,000,000 cu. ft. daily.

The expanded plant will produce a maximum of 125,000 gal. of natural gasoline, 75,300 gal. of propane, 55,780 gal. of normal butane, and 13,800 gal. of isobutane daily. Natural gasoline will be shipped to refineries for blending into motor fuel; butane and propane will be sold for distribution throughout Kansas, northern Oklahoma, and eastern Colorado; and dry gas will be sold to a gas pipe line.

New facilities were erected on a tract adjacent to the older plant.

To handle increased production, the company has added ten 1,675-bbl. horizontal tanks and one 5,000-bbl. sphere tank. This will permit storing 510,000 gal. of natural gasoline, 150,000 gal. of isobutane, 340,000 gal. of propane, and 420,000 gal. of normal butane.

New loading-rack facilities will make it possible to load 40 tank cars and 4 tank trucks at the same time. The expansion of the plant will make it the largest in regard to gas-processing capacity of any of the 13 natural-gasoline and cycling plants now operated by Stanolind in the Mid-Continent area.

N.G.A.A. Adopts Forum Plan To Better 1952 Convention

TULSA.—The Natural Gasoline Association of America has changed its traditional convention routine in preparation for its 1952 meeting scheduled for April 30-May 2 at the Rice Hotel in Houston.

John F. Lynch, N.G.A.A. president, said that increased registration at the association's annual conventions in recent years has influenced the association to drop some general sessions in favor of forums in order to benefit more specialist groups.

"Operations within the industry are now so varied and personnel so divided into groups of specialists that sessions must also be divided to special groups. Too, it is difficult to have all the papers usually presented at a general session of interest to the large group of men who attend," Lynch said.

Frank Matheny, chairman of the program committee, said plans for the forums are shaping up. Separate sessions are scheduled on each of the following subjects:

"Gathering Systems—High and Low Pressure," "Safety and Personnel," "Traffic," "Fractional Analysis," "Corrosion," "Absorption Oils and Efficiency," "Short Cuts in Design Calculations," and "Liquefied Petroleum Gases." The majority of the forums, which will be held during the morning periods of the convention in separate rooms, will have but two papers to permit sufficient time for discussion.

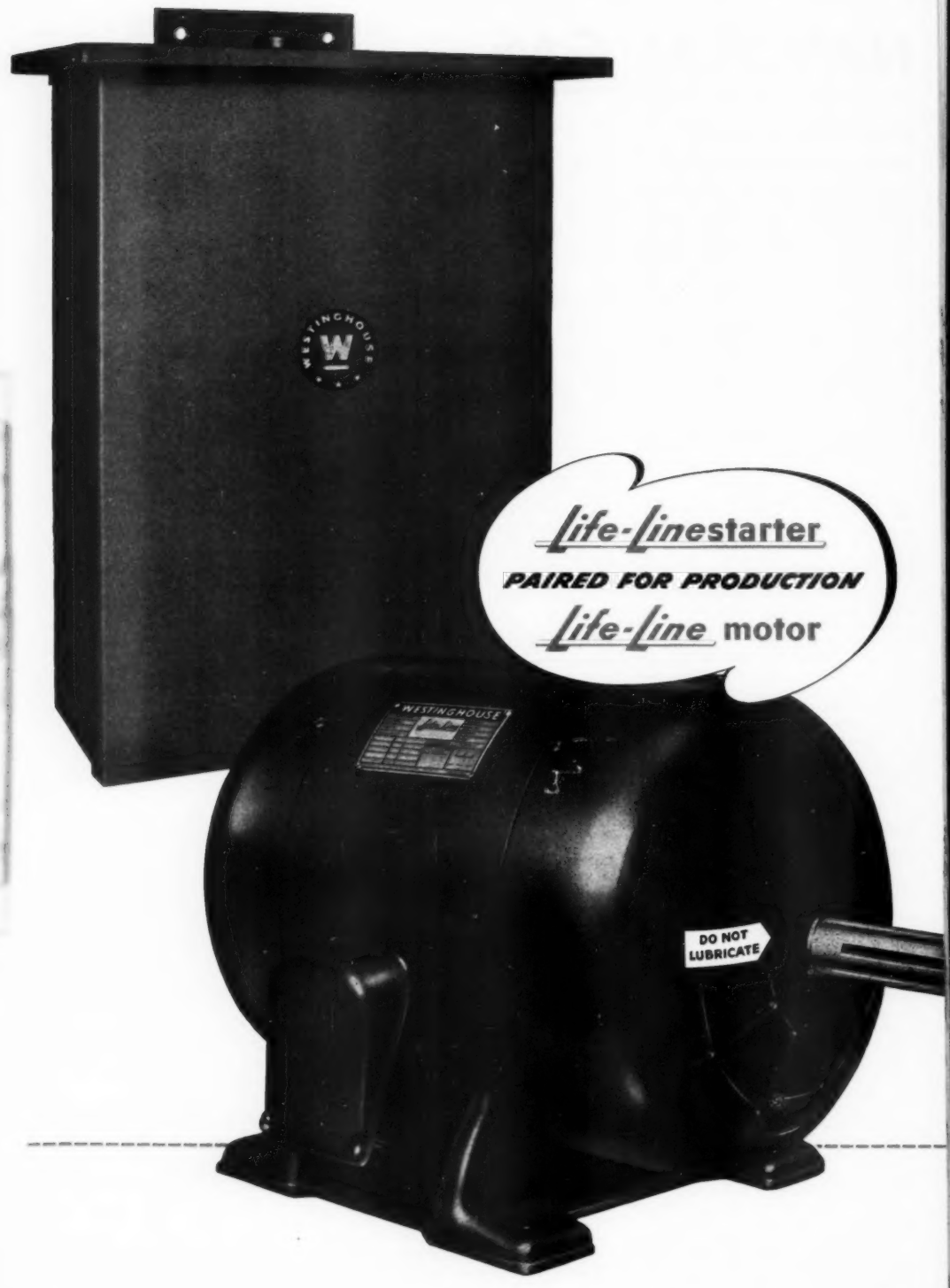
Afternoon periods will be general sessions featuring addresses of broad general interest by nationally known speakers.

Construction Pushed on New $4,500,000 Elk Hills Plant

ELK HILLS, Calif. — Construction of a new $4,500,000 natural-gasoline and pressure-maintenance plant in the Navy's Petroleum Reserve No. 1 is moving rapidly ahead.

Foundations were poured late last month for the plant, which will have a rated capacity of 50,000,000 cu. ft. of natural gas per day. Production will be 45,000 gal. of natural gasoline, 48,000 gal. of propane, 26,000 gal. of butane, and 15,000 gal. of isobutane.

Facilities are being so constructed that capacity eventually can be expanded to 100,000,000 cu. ft. of gas per day.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Protection against weather is part of the story. What's more, these two have the stamina to stand up to continuous pumping duty with a minimum of attention.

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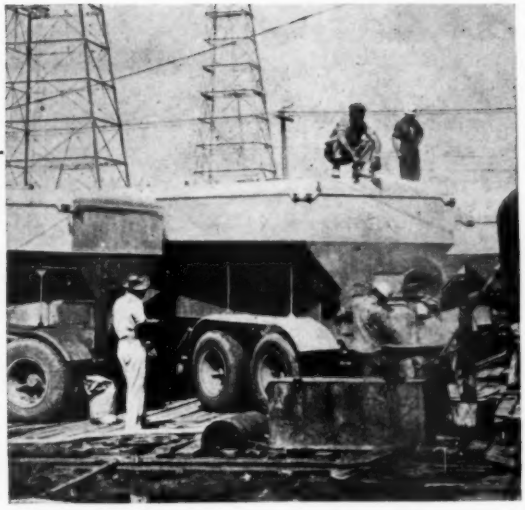

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"THE THEATRE GUILD ON THE AIR"—*Sponsored by U. S. Steel Subsidiaries—Sunday Evenings—NBC Network*

Another Field for Alabama

THE fourth commercial oil-field discovery well in Alabama has been completed just a few miles north of the Florida Panhandle, in Escambia County, by Humble Oil & Refining Co.

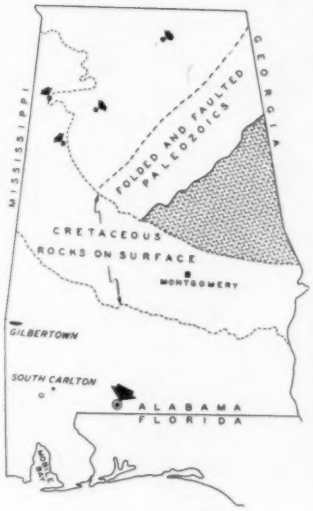
Not only does this discovery extend limits of production in the deep salt basin of southwestern Alabama a considerable distance to the east, but this is the first well to produce a commercial quantity of "light" oil in the state.

Humble 1 A. W. Moye, C NE NW 18-1n-9e, was completed in a 25-ft. thick oil sand of Upper Cretaceous-lower Tuscaloosa through perforations at 5,944-49 ft. for 314 bbl. of 30°-gravity oil on a 3/16-in. choke. Production from all other oil wells in the state is heavy (20°-gravity or lower), black oil. Humble has staked another test 1 mile east of the discovery.

Alabama's first oil field was Gilbertown, discovered in 1944 by Hunt Oil Co. The discovery well was completed in the Upper Cretaceous-Selma chalk at about 2,700 ft.; but later the same year the Eutaw horizon at about 3,300 ft. was opened to production and it was to become the most important producing formation of the field. This field now has 25 wells with a daily average production in excess of 400 bbl. The contiguous East Gilbertown field was discovered in 1945 by Carter Oil Co. This field has 40 wells producing nearly 2,000 bbl. daily from the Eutaw.

During May 1950 Humble completed the discovery well of South Carlton. This Tuscaloosa field now has nine wells making over 300 bbl. daily. Humble has started a 16,000-ft. test on the south edge of this field. Last year during May, Mississippi's Langsdale field was extended into Alabama by one well. This well is now making about 75 bbl. daily from the Eutaw.

Of current exploratory interest in southwestern Alabama is Gulf Refining Co. 2-D State in Mobile Bay about 3 miles south of Mobile. This wildcat, now drilling below 10,620 ft., is slated for 11,000 ft. Last December Gulf 1-D State, in the bay about 20 miles south of Mobile, was completed dry at 10,020 ft. These wildcats followed extensive seismic work by Gulf and mark the initial attempt to develop production in the waters of the bay.



To the north of the Cretaceous outcrop is the Warrior basin, which extends northward to the Nashville dome in Tennessee. Oil and gas showings have been plentiful in the Warrior basin but only four small gas fields (pointed out by small arrows) have been developed. These gas fields, three of which have been abandoned, found their gas in Mississippian rocks.

The Gulf Coastal plain of Alabama has a normal down-to-the-coast dip (south - southwest) in beds younger than the Tuscaloosa except for interruption by the prominent Hatchetigbee anticline and the Jackson fault southeast of Gilbertown fields. The Hatchetigbee anticline was tested by Danciger Oil & Refining Co. during 1950 with a wildcat drilled to 13,496 ft. The Jurassic-Smackover (?) was topped at about 13,000 ft.; it had shows of gas-distillate but tested salt water.

Of special interest is the McIntosh salt dome (marked by open circle just to the southwest of South Carlton field). This piercement-type salt dome was discovered by a Humble core drill following delineation by seismograph in 1948. Salt was topped at 410 ft.

There is much to be learned about the country on to the east of Humble's recent discovery. The basin, though probably shallower than in southwestern Alabama, spreads into adjacent parts of Georgia and the Florida Panhandle and a revival of exploratory drilling in this area can be expected. *Philip C. Ingalls.*

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

WEST TEXAS.—BBM Drilling Co. 1-4 Proctor, dry Spraberry test north of the Aldwell field, Reagan County, was reentered, drilled to the lower Spraberry and completed for 273 bbl. of oil a day. Sinclair 2 Calverley, extension to the Driver field, flowed 1,191 bbl. of oil in 24 hours, a record for the Spraberry zone.

EAST TEXAS.—Woodley Petroleum and Moran Corp. 1 Bruton, Georgetown limestone discovery in Houston County, has set off a lease play along the Angelina-Caldwell flexure.

ROCKY MOUNTAIN AREA.—Another Beaver Lodge, North Dakota, Amerada Petroleum Corp. well flowed oil from the Madison. The well is 5 miles northeast of the discovery well. Shows are rumored for the Mountain Fuel Supply Co. Grizzly Butte, Wyoming, deep test, now in Dakota at 13,174 ft. British-American Oil Producing Co. and Shell Oil Co. have new discoveries in the Denver Julesburg Basin of Colorado and Nebraska.

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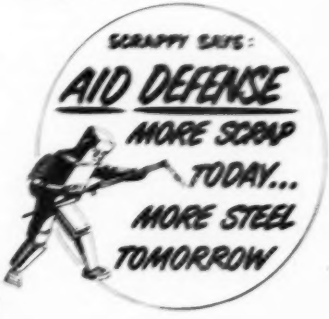
"I'd urge any business to look over its premises with an eye out for scrap. Non-ferrous scrap is needed, too! Why don't you appoint one man—with authority—to act as your Scrap Salvage Director?"



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THE OIL AND GAS JOURNAL
TULSA 1, OKLAHOMA

Texas Gulf Coast

New Wilcox Producing Area Opens in Polk County

HOUSTON.—Three miles southeast of Livingston field, Polk County, Jordan Drilling Co. et al 1 Pearl Wiggins, G. S. Thomas Survey, Abstract 72, is flowing 39.5°-gravity pipe-line oil to open a new Wilcox oil producing area for the Gulf Coast. The well was first perforated at 7,545-55 ft. from which it flowed an estimated 2 to 3 bbl. of oil per hour. Operator went back in the hole and perforated 2 ft. deeper with 12 shots. The well is now cleaning.

In Colorado County, Sinclair Oil & Gas Co. 1 H. R. Houck Tract "A," flowed gas at the rate of 1,000,000 cu. ft per day from perforations at 11,280-90 ft. Operator squeezed off perforations and moved up the hole for additional tests. While moving up the hole, a leak in the casing was detected and operator is now attempting to squeeze the casing. This prospective field opener is located approximately 3 miles west of Rock Island field production.

Meanwhile, in the same county, Anderson-Prichard Corp. has cored a sand section with gas shows at 9,100-07 ft. at 1 R. A. Johnston, located approximately 2½ miles west of New Ulm field. A drill-stem test will be run of this section.

Hassie Hunt Trust 1 Mrs. Bertha Hasdorff, Jackson County wildcat 1½ miles northeast of the abandoned Westhoff Ranch gas field, apparently has opened a new oil pool. Tank batteries have been erected at the well after encountering two good oil sands just below 5,600 ft. and 5,800 ft. Hole is bottomed at 7,009 ft. and 5½-in. casing has been cemented to 6,850 ft. Details on perforations are being withheld by operator.

New deep pay has been established in the Collegeport area of Matagorda County at Brazos Oil & Gas Co. 7 Sam V. LeTulle et al. Dually completed, the well flowed 35,000,000 cu. ft. of gas daily on open flow from the new pay interval at 5,605-32 ft., and 8,500,000 cu. ft. daily from 3,690-3,721 ft.

Morris Cannan 1 Willis Robertson, Bee County oil discovery, has been completed for 100 bbl. of 39°-gravity oil daily from perforations at 6,810-14 ft. Gage was made using 9/64-in. choke with 550 psi. tubing pressure and 1,050 psi. casing pressure. Production is from the Slick-Wilcox which was topped at 6,792 ft. and continued on down to 6,834 ft. The well is located 1½ miles southeast of Plummer-Wilcox field production.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT SUCCESSES

Calhoun County: Gas-distillate discovery—Southern Minerals Corp. 1 W. L. Traylor, Phillip Dimmitt Sur., TD 9,015 ft., perf. 7,514½-21½ ft., IP: 27 bbl. dist. per day, 14/64-in. choke.

Lavaca County: Gas-distillate discovery—Cities Service Oil Co. 1 D. I. Underwood, F. Fuchs Sur., A-182, TD 10,960 ft., perf. 9,673-85 ft., IP: 60 bbl. dist. per day, 55.6°-gravity, TP 640 psi.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Calhoun County: Quintana Petroleum Corp. 1 A. S. Bowers Est., Pascual Guarjardo Sur., dry, TD 8,845 ft.

Colorado County: Sinclair Oil & Gas Co. 1 Foster Gas Unit, R. Splane Sur., A-4, dry, TD 10,999 ft.

DeWitt County: Mizel Bros. 1 Alfred Friar, Andrew Neill Sur., A-370, dry, TD 5,200 ft.

Standard Oil Co. of Texas 1 Lebrecht Pieper, John Nelson Sur., A-365, dry, TD 9,002 ft.

Fayette County: Forrey, Winn, Sutton & Co. 1 Wallace Cherry, F. Al Bettinger ⅓ League, dry, TD 2,550 ft.

Harris County: The Texas Co. 1 August Scholl, W. H. Settle Sur., A-705, drl, TD 7,214 ft.

Jackson County: Union Sulphur & Oil Corp. 1 "L" Ranch Co., I&GN Sur. 23, A-152, dry, TD 8,778 ft.

Liberty County: Houston Oil Well Service Co. 1 Edwin F. Hohn, Sec. 115, H&TC RR Co. Sur., dry, TD 10,518 ft.

Matagorda County: Austral Oil Exploration Co. 1 Mrs. Clarence Doman, H. Harrison Sur., A-46, dry, TD 9,418 ft.

Newton County: Humble Oil & Refining Co. 1 Bleakwood Gas Unit 1, N. B. Lewis Sur., A-265, dry, TD 11,500 ft.

Orange County: American Republics Corp.-Houston Oil Co. of Texas 2 I&GN RR Co. fee, I&GN RR Sur., Sec. 12, A-116, dry, TD 8,720 ft.

Victoria County: Quintana Petroleum Corp. 1 C. K. McCan et al, C. O. Edwards Sur., A-526, dry, TD 6,105 ft.

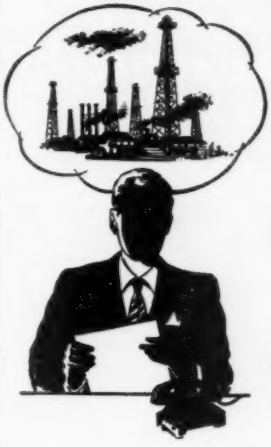
Wharton County: Sohio Petroleum Co. 1 L. B. Outlar, William McFarland League, A-41, dry, TD 5,523 ft.

South Louisiana

Lafourche Discovery Has Good Show

NEW ORLEANS.—Final completion has been made at F. A. Callery, Inc., 1 Caldwell Sugars, 19-14s-16e, Lafourche Parish gas-condensate discovery. Through 10/64-in. choke, the well showed good for 162 bbl. of 48.7°-gravity condensate plus 1,855,000 cu. ft. of gas per day. Production is from perforations at 13,617-33 ft. The new discovery is approximately 5 miles north of Chacahoula field.

The Texas Co. apparently has indications of an oil discovery in the Shell Point area of Lake Borgne, Orleans Parish. The well, 1 State-Shell Point, was perforated 9,900-25



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ft. and packer failed. After being reset at 9,843 ft., the well was opened and failed to flow. Operators swabbed at 5,200 ft. and fluid flowed on ¼-in. choke, being 90 per cent wash water and 10 per cent water. The well died and operators acidized. The company is connecting separator at the venture prior to running gage.

At the old Sorento field, Ascension Parish, where oil was first discovered east of the Mississippi River in Louisiana, Texaco has completed 18 United Lands Co. in a new reservoir for the field. From perforations at 7,443-73 ft., the well produced at the rate of 76 bbl. of pipe-line oil daily through 6/64-in. choke. Gravity of the oil was 37.9°.

Humble Oil & Refining Co. is testing 1 L. L. & E. "F," extension attempt at Little Lake gas field, Jefferson Parish. A drill-stem test at 11,678-11,710 ft. recovered 600 ft. of mud and 1,800 ft. of gas-cut mud and water. These perforations were squeezed and operators reperforated at 11,516-28 ft. but found only a flow of salt water. Several sands remain to be tested in the well, however, the firm did not indicate where the next test would be made.

No shows have been announced at Magnolia Petroleum Co. 1 Ragley Lumber Co. "D," Allen Parish wildcat which broke the depth record for the state. Operators are now drilling below 18,365 ft.

The Texas Co. has returned to 1 State-Blind Bay, wildcat abandoned last year in Plaquemines Parish, and is now testing perforation sat 10,014-44 ft. Hole was drilled to total depth of 16,003 ft. and has 7-in. casing cemented at 13,970 ft. Operators went back into the well, plugged back to 10,050 ft. for testing.

SOUTH LOUISIANA WILDCAT SUCCESS

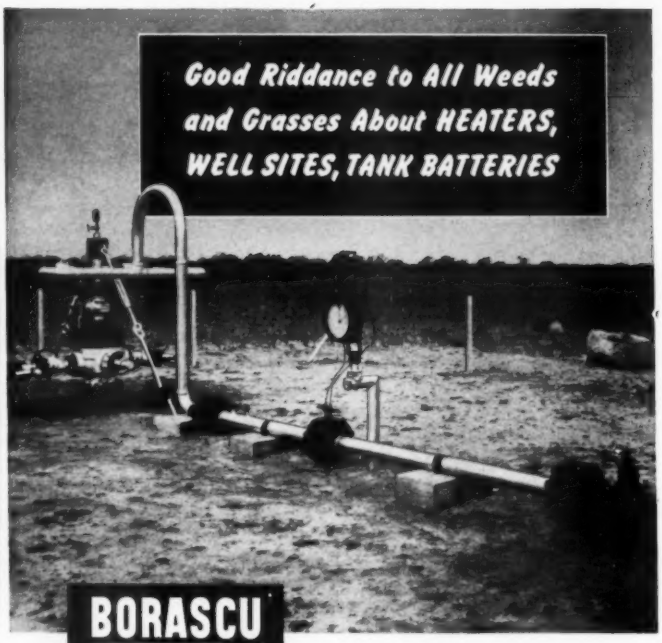
St. Landry Parish: Gas-distillate discovery —Sohio Petroleum Co. 1 Thistlewaite Lumber Co., 64-4s-4e, TD 11,778 ft., perf. 9,287-91 ft., IP: gas-condensate well, no gage.

SOUTH LOUISIANA WILDCAT FAILURES

Avoyelles Parish: Pan Am Southern & D. D. Feldman 1 Southwestern Improvements Co. Block 1, 26-2n-6e, dry, TD 9,862 ft.

Point Coupee Parish: Sinclair Oil & Gas Co. 1-A Joseph C. Beaud, 3-4s-10e, dry, TD 12,326 ft.

Rapides Parish: Hunt Oil Co. 1 B. E. Smith, 16-1n-2w, dry, TD 10,504 ft.



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Eastern Texas

Georgetown Lime Success Creates Interest in Midway

DALLAS.—Successful completion in the Georgetown limestone of Woodley Petroleum Co. 1 W. T. Bruton, (see completions), has created considerable interest, and leasing, in what is known as Georgetown trend, extending northeast from Seguin in Guadalupe County to the Sabine River dividing Texas and Louisiana.

Woodley Petroleum 1 Bruton was drilled to 10,038 ft., then plugged back to 9,230 ft. and completed from pay between 9,170-9,210 ft.

Location of the well is 6½ miles northwest of Midway near the bank of the Trinity River. It is 850 ft. northeast of The Texas Co. 1 Forrest, which had discovery production in the Buda lime at 9,017-36 ft. Reports indicated The Texas Co. would move in and deepen their well to the Georgetown formation.

Angelina County had a possible Wilcox sand discovery in the making at B. G. Byers and E. L. Kurth 1-A Angelina County Lumber Co., T. Caro Survey, 6 miles southeast of Lufkin. A drill-stem test in sand at 3,935-40 ft. flowed oil at the rate of 4 bbl. an hour and recovered 970 ft. of oil in the pipe.

Texas Crude Co. 1 Westgate-Greenland, new pay for the Deu Pree field near Pine Mills, completed for 315 bbl. of oil a day from pay section at 5,037-43 ft. Top of the zone was 5,037 ft. on elevation of 469 ft., derrick floor.

American Liberty Oil Co. announced locations for two wildcats. In Bowie County the 1 T. A. Jackson was located on a 640-acre lease in the TPRR Survey, 2½ miles southeast of Dalby Springs. In Hunt County, location was made for 1 J. W. Barrow, 4 miles southeast of Quinlan in the Reese Price Survey. Work was to start shortly on both tests, with contract depths of 5,000 ft. on each hole.

EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT SUCCESSES

Houston County: Woodley Petroleum Co. 1 W. T. Bruton, B. Clark Sur., TD 10,038 ft., PB 9,230 ft., IP 273 bbl. 43°-gravity oil, 1/64-in. choke, TP 1,700 psi., GOR 1,500 cu. ft.

Kaufman County: Humble Oil & Refining Co. 1 Ed Legg, F. Cortez Sur., TD 3,940 ft., perforated 3,235-50 ft., IP 116.8 bbl. 35°-gravity oil, 11/64-in. choke, TP 105 psi.

EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES

Angelina County: Byars & Kurth 1 Angelina Lumber Co., Thomas Caro Sur., dry, TD 7,340 ft.

Byars & Kurth 2 Angelina Lumber Co., Caro Sur., dry, TD 5,256 ft.

Cass County: R. E. Smith 1 J. L. Allgood, C. Jurnigan Sur., dry, TD 7,291 ft.

Grayson County: Standard Oil Co. of Texas 1 Bradshaw, L. Reed Sur., A-1,029, dry, TD 9,100 ft. Pennsylvanian 7,020 ft., Oil Creek 8,340 ft., Ellenburger 8,525 ft.

Hunt County: F. C. Ramsey 1 H. Dooley, W. Darnell Sur., dry, TD 4,938 ft.

Smith County: Wisconsin Iron & Metal Co. 1 E. H. Vaughn, G. Myers Sur., dry, TD 7,985 ft.

Titus County: Coats & Moore 1 R. L. Bryant, D. Thomas Sur., dry, TD 4,570 ft.
Van Zandt County: D. H. Byrd 1 D. H. Byrd, J. Adams Sur., dry, TD 7,665 ft.
Wood County: Sam Sklar 1 A. O. Harris, J. Gregg Sur., dry, TD 5,100 ft.

Mississippi

Escambia Well is Major Alabama Oil Discovery

JACKSON.—Humble Oil & Refining Co. 1 A. W. Moye, C NE NW 18-1n-9e, major oil discovery in Escambia County, Alabama, flowed 314.07 bbl. of 30°-gravity oil daily through ⅛-in. choke. The well is producing from the Lower Tuscaloosa at 5,944-49 ft. under tubing pressure of 300 psi. Gas oil ratio was 45 to 1 on the test.

This test encountered 27 ft. of oil sand, with the first indication of the oil bearing zone being in core cut at 5,935-45 ft. This core contained 2 in. of hard green oil sand. A subsequent core at 5,945-50 ft. recovered 5 ft. of oil sand. Drill-stem test was conducted at this interval, which recovered oil in 24 minutes. Coring was later resumed with recoveries being as follows: 5,950-55 ft., recovered 5 ft. of oil sand; 5,955-60 ft., recovered 5 ft. of oil sand; 5,965-70 ft., recovered 5 ft. of oil sand; 5,970-75 ft., recovered 2 ft., of which 1 ft., was oil sand and the other salt water sand.

In Amite County, Mississippi, Humble Oil & Refining Co. is still attempting to establish production at 1 H. C. Spears, 27-1n-6e. After 25-hour drill-stem test of perforations at 11,612-35 ft. recovered only 30 bbl. of net oil, casing was reperforated at 11,614½-20½ ft. and 11,625-48 ft. Tubing was run and at last report, the well was being swabbed with recovery being at the rate of 18 bbl. of oil plus 315 bbl. of water daily.

New Wilcox oil production is being established in Knoxville Tower field, Franklin County, at Hunt Oil Co. et al U. S. A., 20-5n-2e. Production in this well is from the top of the Wilcox, which is unusual for this area where most Wilcox production is approximately 2,000 ft. below the top of the formation. Casing was perforated at 4,569-72 ft. and on drill-stem test using ⅝-in. bottom and ¼-in. top chokes, fluid was to the surface in 7 minutes. The well flowed at the rate of 115 bbl. of oil per day based on 8-hour test. Test tool has been pulled and tubing is being run for completion attempt.

West Lincoln field, Lincoln County, Mississippi, has been extended 1 mile to the west with completion of Roeser & Pendleton, Inc., 1-A Board of Supervisors, SE SE 16-6n-6e. On potential test, this well flowed 144 bbl. of 38°-gravity oil daily from perforations in the Lower Tuscaloosa at 10,615-33 ft. Gage was made using ⅛-in. choke.

The discovery well for Courtland field, Adams County, B. Serio Drilling Co. 1 H. W. Carter, 28-5n-1w, suddenly developed salt water trouble. After operator had run drill-stem test, which was used as a potential test, the well kicked while tubing was being run. Because of this, the well was not washed and was allowed to clean itself. It made mud for 2 or 3 days, after which time salt water suddenly broke in. At last report, the well was making approximately 40 per cent salt water and tubing pressure had dropped to 200 psi. on 12/64-in. choke. It is believed that a channel has developed in the cement back of the casing.

MISSISSIPPI WILDCAT FAILURES

Adams County: John S. Callon 1 H. W. Carter, 51-6n-1w, dry, TD 7,024 ft.
Franklin County: Lion Oil Co. 1 Bud Anderson, 18-5n-1e, dry, TD 7,004 ft.
Lion Oil Co. 1 Board of Supervisors, 16-5n-2e, dry, TD 7,510 ft.
Jefferson County: D. C. Latimer & Sunnyland Contracting Co., Inc., 1 H. C. A. Fleming et al, 45-8n-2e, dry, TD 6,518 ft.

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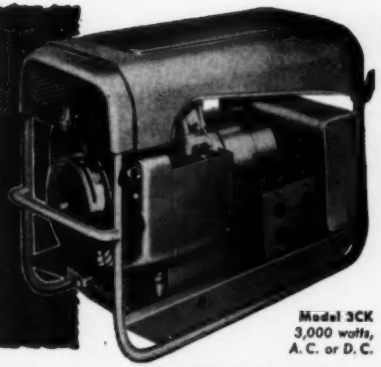

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North Dakota Tests May Prove Predictions

DENVER.—Cores and tests in the Madison at Amerada Petroleum Corp. 1 North Dakota "A," C NE SE 16-156n-95w, Beaver Lodge, Williams County, North Dakota, indicate that the operators prediction of a 36,000-acre producing area for this pool may prove correct. This well flowed on drill-stem tests of the Madison, topped at 8,244 ft. However, the top of the formation was dense and lacked porosity and the test 8,424-83 ft. was the first to find free oil. Oil flowed on that test in 189 minutes, with the rate at 44.16 bbl. in 4 hours. Oil was also recovered on subsequent tests and the operator is now testing with total depth at 8,537 ft. This well is 5 miles northeast of Amerada's first North Dakota completion, the 1 Iverson, at Beaver Lodge. Recently Amerada petitioned the State Industrial Board for an 80-acre spacing in this pool, rather than the present 40-acre spacing established for the state.

Amerada may also be near completion on the Tioga area wildcat, north of Beaver Lodge, at 1 Bakken, C SW NW 12-157n-95w, Williams County. This well was the first to recover Madison oil along the general Nesson anticline, and the well flowed oil from that formation. Amerada has continued drilling and reported Devonian salt at 10,905 ft. Cores below that depth have had some oil and gas shows and the well is now at 12,551 ft., total depth, with the operator preparing to core. A test 12,290-12,550 ft., open 4 hours, showed 450 ft. of gas-cut mud, 1,100 ft. of oil and gas-cut mud, with flowing pressure 2,090-2,395 psi. and shutin pressure 4,380 psi. Amerada's first oil production at 1 Iverson was from Devonian and the well was subsequently plugged back for recompletion in the Madison.

A wildcat of interest for southwestern Wyoming is unofficially reported to have shows. The well is Mountain Fuel Supply Co. 1 Unit, NE SE SW 35-15n-113w, Grizzly Butte, Uinta County, southwest of the company's Church Buttes field. The operator reports the well at 13,174 ft., total depth, and no formation tops nor tests have been reported. However, it is believed that Frontier was logged at around 1,600 ft. and that the formation was hard and tight. Dakota was found at 12,963 ft. and shows are rumored in that formation. Mountain Fuel made a Dakota-Lakota sand discovery at Church Buttes in 1946 and since that time has been on a continuous drilling program developing gas and distillate from those formations. A discovery at Grizzly Butte would aid considerably in furnishing gas supply for the company's distribution system through the general Salt Lake City area.

British-American Oil Producing Co. has an interesting discovery at 1 Schwake, NE SW NE 6-11n-52w, wildcat in north-central Logan County, Colorado. The well flowed oil in 25 minutes, at the rate of 19.8 bbl. of oil per hour, from the J sand between 5,299-5,315 ft. This well flowed an estimated three to four million cubic feet of gas daily from the D sand between 5,147-72 ft., and British-American is now coring below 5,315 ft. and will complete the discovery in the J sand. The well is northeast of British-American's Armstrong field, where oil was first discovered in the current Logan County play.

Northwest of the new British-American discovery Shell Oil Co. has a new-pay discovery in the Southwest Potter area. The well is 1 Larson, SW NW SW 2-13n-53w, Kimball County, Nebraska, and on test of the Dakota (J sand) topped at 5,642 ft., the well made 3,620 ft. of oil and 100 ft. of heavily oil and gas-cut mud in 1 hour. Shell is running casing with total depth at 5,717 ft. for completion in the J sand. The Wytex Oil Co.-Derby Oil Co. discovery in this field, completed last year, produced oil from the D sand (Muddy).

COLORADO WILDCAT FAILURES

Rio Blanco County, White River: Union Oil of California and Frontier Refining Co. 1 Unit, SW SE SW 30-2n-96w, dry, TD 8,520 ft., Mesaverde 3,600 ft., Mancos 7,620 ft., Morapos 8,480 ft.

Weld County, Alice Nay Block: Zimith Drilling Co. 1 Nay, SW SW NE 14-9n-58w, dry, TD 6,310 ft., Niobrara 5,486 ft., base Codell 5,717 ft., Muddy 6,170 ft., Dakota 6,256 ft.

Eagles Nest: Frontier Refining and Niloco 1 Krause-Littler, SE SE SW 28-4n-62w, dry, TD 7,190 ft., Hygiene 3,365 ft., Niobrara 6,086 ft., Carlile 6,385 ft, Greenhorn 6,577 ft., no D sand, J sand 6,835 ft., Lakota 7,086 ft., Morrison 7,176 ft.

Saltmount Oil Co. 1 C. L. Gross, SE NW NE 34-6n-61w, dry, TD 6,899 ft., Hygiene 3,300 ft., Niobrara 6,205 ft., Ft. Hays 6,365 ft., Carlile 6,405 ft., Greenhorn 6,661 ft., D sand 6,806 ft., J sand 6,872 ft.

WYOMING WILDCAT FAILURES

Goshen County, North Fort Laramie: Continental Oil Co. 1 Parsons, 990 ft. N SL and E WL Tract 92, Sec. 35-28n-62w, dry, TD 7,099 ft., Niobrara 3,650 ft., Carlile 3,848 ft., Greenhorn 4,215 ft., Graneros 4,315 ft., Dakota 4,875 ft., Morrison 5,005 ft., Sundance 5,105 ft., Spearfish 5,335 ft., Minnekahta 5,690 ft., Opeche 5,755 ft., Minnelusa 5,825 ft., Guernsey 7,040 ft.

Niobrara County, Pine Lodge: Lion Oil Co. 1 Hanson-Government, C SE SW 10-35n-63w, dry, TD 3,396 ft., first Leo 2,692 ft., second Leo 2,846 ft., third Leo 2,953 ft., Bell sandstone (?) 3,250 ft., Madison 3,345 ft.

MONTANA WILDCAT FAILURE

Big Horn County, Lodgegrass: Union Oil of California 1 AL 1490, C SW SW 31-6s-35e, dry, TD 5,066 ft., Thermopolis 2,550 ft., Muddy 2,970 ft., Dakota 3,070 ft., Lakota 3,270 ft., Morrison 3,435 ft., Sundance 3,725 ft., Chugwater 4,220 ft., Tensleep 4,732 ft., Amsden 4,755 (?) ft., Madison 5,050 ft.

WESTERN NEBRASKA WILDCAT FAILURES

Deuel County: Ryan Oil Co. 1 Reese, NE NE NE 13-12n-46w, dry, TD 4,192 ft., Niobrara 2,855 ft., Ft. Hays 3,220 ft., Codell 3,265 ft., Greenhorn 3,435 ft., D sand 3,664 ft., J sand 3,768 ft., base J sand 3,818 ft., M sand 3,916 ft., Morrison 4,166 ft.

Morrill County: Sinclair Oil & Gas Co. 1 Clair V. Gilbert, NW NW NW 19-20n-47w, dry, TD 5,005 ft., Muddy 3,963 ft., Skull Creek 4,109 ft., Dakota 4,220 ft., Morrison 4,502 ft.

North Central Texas

Gardner Sand Discovery Seen in Coleman County

WICHITA FALLS.—Northwest Coleman County had a Gardner sand discovery in prospect, on the basis of a 20-bbl. an hour flow on drill-stem test at Richard King, Jr., et al 1 C. F. Sappington, Section 12, T&NO Survey, 2 miles south and 1 mile west of Glen Cove.

Top of the sand was 3,419 ft., on elevation of 2,059 ft., derrick floor. The test, which had not been completed, had gas in 2½ minutes and oil in 12½ minutes. Another source credited the well with making a steady flow of 10 bbl. of oil an hour for the 40-minute duration of the test. Section tested was from 3,419-35 ft. Bottom-hole flowing pressure was 975 psi. and 20-minute shut-in pressure was 1,225 psi. Nearby production in the Glen Cove field is from the Jennings sand, around 3,600 ft.

Montague County had a lower conglomerate discovery ready for completion potential, and operators had skidded rig one location east for a confirmation test. The new prospect was Hiawatha Oil & Gas Co. 1 Caswell, 5 miles east of Sunset and 6 miles from the Richardson Caddo field. On drill-stem test of perforations at 6,210-20 ft., the well flowed 12 bbl. of 39°-gravity oil an hour through ½-in. choke. Tentative identification of the pay section was the Bend conglomerate.

George Engle 1 Joe Benton, new wildcat 3 miles southeast of Stoneberg, was moving in rotary. Engle 1 Fenoglio, wildcat in the J. M. Collier Survey, was drilling in shale at 5,650 ft. and the same operator's 1 J. W. McCall, J. Brumley Survey, was in shale at 5,650 ft.

In Nolan County, Union Oil Co. of California 1-34 Mary Campbell flowed 54 bbl. of oil in 5 hours and died, then was swabbed dry in 25 hours. After being shut in 3 hours the well flowed 49.8 bbl. of oil in 12 hours. Operators were ready to make potential tests.

Sun Oil Co. 3 S. R. Featherstone, wildcat southeast of Sweetwater, was drilling below 6,197 ft. Southwest of Sweetwater, Sun 5 B. K. Stone was drilling in shalt at 5,286 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT SUCCESSES

Coleman County: Bay Petroleum Corp. 1 Dunman Unit 1, Sec. 47, GRR Sur. 47, TD 3,150 ft., elev. 1,840 ft., pay 3,140 ft., IP 191.6 bbl. 41°-gravity oil in 18 hr., TP 600 psi., GOR 2,250 ft., choke (?).

Eastland County: J. J. Lynn 1 C. C. Pippen, Sec. 3,170, TE&L Sur., TD 4,062 ft., elev. 1,570 ft., Ellenburger 4,036 ft., perforated 4,030-48 ft., IP 101.6 bbl. 40°-gravity oil, 12/64-in. choke, TP 75 psi., GOR 840 cu. ft.

J. J. Lynn 3 J. Arnold, 44-4-H&TC, TD 1,597 ft., elev. 1,538 ft., pay 1,591 ft., IP pumped 3 bbl. 38°-gravity oil.

Montague County: George S. Engle 1 W. O. Reynolds, Blk. 50, Guadalupe College Sur., TD 5,439 ft., pay 5,371-81 ft., IP 143 bbl. 46°-gravity oil, 12/64-in. choke, TP 250 psi., GOR 600 cu. ft.

National Associated Petroleum Corp. 1 Bonnie Rich, A Boren Sur., A-882, TD 5,850 ft., elev. 879 ft., conglomerate pay 5,607 ft., IP 1,296 bbl. 41°-gravity oil, 16/64-in. choke, TP 575 psi., GOR 600 cu. ft.

Wilbarger County: R. Clay Underwood 1 W. T. Waggoner Estate, 36-6-H&TC, TD 1,853 ft., pay 1,841 ft., IP pumped 22 bbl. 36°-gravity oil.

R. Clay Underwood 2 Waggoner, 36-6-H&TC, TD 1,841 ft., pay 1,631 ft., IP pumped 68 bbl. 36°-gravity oil.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: L. T. Burns 1-A G. D. Prideaux, R. Crossman Sur., A-65, dry, TD 5,366 ft.

Callahan County: George A. Hughes 1 Sarah Henessey, 91-13-T&P, dry, TD 1,850 ft.

W. E. Pittman 1-A Wagley, Sec. 2,996, TE&L Sur., dry, TD 1,995 ft.

John H. Wilson 1 Fae Wilbanks, J. H. Johnson Sur., dry, TD 2,188 ft.

Clay County: Armour Properties 4-A Scaling, G. H. Belcher Subd., dry, TD 5,100 ft.

National Associated Petroleum Co. 1 G. W. Edwards, Blk. 4, 4 mi. NE Shannon, dry, TD 6,691 ft., elev. 1,133 ft., Ellenburger 6,445-65 ft.

The Texas Co. 1 O. B. Leath, Sec. 13, BBB&C Sur., dry, TD 3,445 ft.

Coleman County: Callahan Rotay Co. 1 Mrs. George Teagle, Sec. 272, Wade Bynum Sur., dry, TD 1,939 ft.

Harry Denton 1 T. R. Louder, Sec. 307, T. S. Goodman Sur., dry, TD 3,405 ft., elev. 1,996 ft., Morris sand 3,152 ft., Capps 3,164 ft.

Joe Krchnak 1 Tom Stewdardson, J. A. Sylvester Sur., dry, TD 2,662 ft.

Comanche County: Midland Oil Co. 1 R. Mitchell, Sec. 10, Lampassas CSL, dry, TD 2,909 ft., Barnett 2,820 ft.

Cooke County: Headwaters Oil Co. 1 M. D. Sissney, Asa Hartfield Sur., dry, TD 4,540 ft.

South Alabama Oil Co. 1 W. F. Solomon, J. C. Meeks Sur., A-758, dry, TD 2,143 ft.

Eastland County: Hooker & Demohrenschildt 1 Stroebel, 71-3-H&TC, dry, TD 3,963 ft., Marble Falls 3,253 ft.

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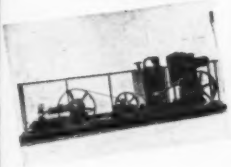

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Midway Oil Co. 1 W. H. Grove, Sec. 473, SPRR Sur., dry, TD 3,573 ft.

Fisher County: B. B. Orr 1 J. M. Wagstaff, Sec. 6, Berry & Coggin Subd., dry, TD 3,211 ft.

Haskell County: M. M. Milsap 1 C. A. Frierson, Sec. 6, A. Richie Sur., dry, TD 4,041 ft.

Youngblood & Foree 1 Kleiner, R. Langham Sur., A-307, dry, TD 5,418 ft., elev. 1,447 ft., reef 3,340 ft., Strawn sand 4,743 ft.

Jack County: D. H. Bolin 1 C. P. Gahagan, Sec. 2,740, TE&L Sur., dry, TD 3,863 ft.

Russell Maguire 1 Dora Shawver, J. H. Wax Sur., dry, TD 4,615 ft.

Jones County: T. B. Dillard et al 1 A. L. Mullins, F. M. Smith Sur., dry, TD 2,067 ft., Sedwick 1,222 ft.

Jones & Stasney 2 Prewitt, Sec. 21, D&-DAL Sur., dry, TD 3,585 ft.

Seneca Oil Co. 1 Rule-Jayton Cotton Oil Co., Sec. 13, BBB&C Sur., dry, TD 2,607 ft.

Garrett M. Smith 1 R. N. Richardson, Sec. 10, BAL Sur., dry, TD 2,048 ft., elev. 1,763 ft., Flippen 1,695 ft., Hope 1,815 ft.

Knox County: Sinclair Oil & Gas Co. 1 E. E. Bewley, 258-44-H&TC, dry, TD 6,331 ft., Megargel 2,939 ft.

Montague County: Continental Oil Co 34-A J. W. Maddox, Blk. 1, C. W. Thompson Sur., dry, TD 2,491 ft.

Mid-Continent Petroleum Corp. 1 J. W. Holmes, Forrester Sur., A-278, dry, TD 6,530 ft.

Nolan County: Jack Frost 1 E. L. Frost, Sec. 243, H&TC Sur., dry, TD 6,190 ft.

Shackelford County: F. Craig Morton 1 J. A. Mathews, J. M. Strader Sur., dry, TD 1,252 ft.

Thomas & Rogers 1 V. A. Reames, BAL Sur., dry, TD 998 ft.

Stephens County: Charles E. Knox 1 P. P. Pierce, 82-4-T&P, dry, TD 1,701 ft.

Wilbarger County: Rundell and Medford Drilling Co. 1 J. M. King, 7-14-H&TC, dry, TD 1,755 ft.

Young County: Bridwell Oil Co. 2 Mrs. S. E. Snider, A-1,276, 3½ mi. N Markley, dry, TD 4,745 ft., Caddo 4,500 ft.

John H. Wilson 1-F Jeffery, TE&L Sur. 58, dry, TD 895 ft.

Southwest Texas

Jim Wells Discovery Completed For Oil

CORPUS CHRISTI.—The Texas Co. has completed 2 Hoelscher, oil discovery in Los Presenos de Abajo Grant, Abstract 171, Jim Wells County. Through ⅛-in. choke, the well flowed 83 bbl. of 41.8°-gravity oil daily from perforations at 5,053-63 ft. Hole is bottomed at 5,638 ft. and 5½-in. casing was cemented at 5,133 ft.

Texaco has staked location for a confirmation test in the area. Venture is 1 Ted H. True, located 690 ft. northeast of the discovery. The area is 2 miles south of Hollow Tree field.

Ten miles northwest of Escobas, A. M. Lacey and H. E. Walton 2 Garza, San Antonio de Mira Flores Grant, Zapata County, is running casing to test oil shows logged in the Garcia sand. The well had show in core from 3,067-71 ft., and recovery was lost in core from 3,071-76 ft. Drill-stem test of the section is reported to have recovered oil and gas-cut mud, but details are not available.

Thomas Jordan has run completion gage at 1 H. N. Bell, Jr., wildcat oil discovery in Bastrop County, which is producing from a Georgetown lime fracture in open hole at 3,038-3,140 ft. The well flowed 120 bbl. of 16.8°-gravity oil through ¼-in. choke under 75 psi. pressure. The discovery is located in Albert Black Survey, Abstract 84, 2 miles northwest of Sayersville.

New pay has been established in North Sinton field, San Patricio County, at

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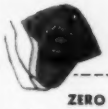

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Plymouth Oil Co. A-23 R. H. Welder, Section 74, Welder Ranch Subdivision. Through perforations at 4,733-39 ft., the well flowed 108 bbl. of 30.7°-gravity oil daily through X-31 choke. Tubing pressure registered 475 psi. Well is bottomed at 5,965 ft. with 5½-in. casing set at 4,817 ft.

In Val Verde County, Western Natural Gas Co. 1 Adah Cauthorne, wildcat in the northeast corner of the county, has run electric log to total depth of 10,224 ft. and operators are conducting drill-stem test in the bottom of the hole. This venture is located a mile northwest of R. J. Carraway 1 Guida Rose, which was completed as a gasser in the Strawn lime. The Cauthorne well failed to produce on earlier tests conducted at 10,059-92 ft. and 9,710-35 ft.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT SUCCESSES

Nueces County: Gas distillate discovery—H. H. McFarland 1 Kate D. Bluntzer, Share-1-1e Bluntzer Partition, TD 6,260 ft., perf. 5,848-53 ft., IP: 39 bbl. condendate per day, ¼-in. choke, 59.1°-gravity, TP 2,264 psi.

Webb County: New pay at Bruni—Cannan & Textita Oil Corp. 1 A. M. Bruni, A. Arispe Grant, Sec. 7, J. R. Foltz Subd., TD 3,964 ft., Yegua 3,933-43 ft., IP: 56 bbl. oil per day, 44°-gravity, 10/64-in. choke, TP 150 psi.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Atascosa County: R. L. Lynd 2 Raussean, Roos Bros. Subd. Sur., Trace 1, dry, TD 4,844 ft.

Caldwell County: John C. Robbins, Jr., 1 W. E. Lamb, William House Sur., dry, TD 1,939 ft.

Frio County: Newman Bros. Drilling Co. and Alaska Steamship Co. et al 1 Carroll Nations Lease, Tankersley Sur., A-1291, dry, TD 4,274 ft.

San Patricio County: The Superior Oil Co. 27-1 Minnie S. Welder, C. J. Francisco & E. Portilla Sur., A-25, dry, TD 8,850 ft.

Webb County: Hassie Hunt Trust 1 Carlos Y. Benavides, Sur. 1,994, Blk. TM RR, dry, TD 5,503 ft.

O. W. Killam 2 J. O. Walker, Frost National Bank et al, Guiterrez Pasture J. V. Borrego Grant, dry, TD 4,440 ft.

Wilson County: Carter & Carter 1 L. Rice Est., Danied Bird Est. Sur., A-41, dry, TD 2,925 ft.

Zapata County: Dulaney Oil Co. 3 Roman Garza, BS&F Sur. 161, Share 2, Blk. 4, dry, TD 1,905 ft.

Canadian Fields

First Medium-Light Crude Discovery Is Producing

CALGARY. — Saskatchewan's first medium-light crude oil discovery well has been placed on production, and the rig from that oil well is being shifted to site for the first-follow-up venture. This discovery was made in the southwest sector of Saskatchewan, at a wildcat drilled by Socony-Vacuum Exploration Co. on farm-out lands from Western Prairie Exploration Co.

The discovery well is Socony-Western Prairie 1 Fosterton, previously known as 1 Roseray, located on LSD 2, 10-17-18w3, about 28 miles northwest of Swift Current and 70 miles east of the Alberta border.

Crew ran a 4-hour initial potential test through ¼-in. choke, and the well flowed 24°-gravity crude oil at the rate of 298 bbl. daily. Top of the Lower Cretaceous oil pay zone was 3,065 ft., and the well found about 60 ft. of gross pay without sign of formation water. There is, however, some hard unproductive formation present in that 60-ft. section.

The rig that drilled the discovery well is now enroute to the first follow-up venture, Socony-Western Prairie 9-36 Fosterton, on LSD 10, 9-17-18w3, 1 mile northwest of the discovery.

After finding a D3 water-free oil zone of approximately 58 ft. in thickness the Red Deer Lake-New Norway area dual zone Devonian oil discovery well has entered water, and crew is now carrying out preliminary operations prior to placing the well on production. This venture, in addition to being assured of substantial production from the D3, found around 111 ft. of D2 water-free zone.

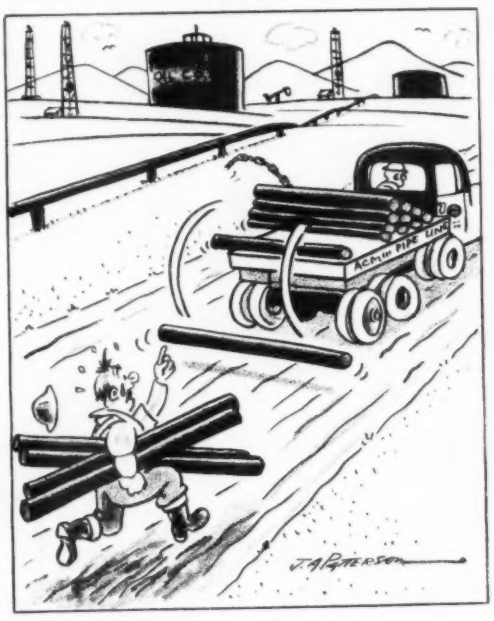
The duel discovery well is Scurry-Explorers 1 New Norway, on LSD 16, 10-44-22w4, about 120 miles northeast of Calgary and 3½ miles southwest of the New Norway Devonian oil pool. Crew will run electrolog and velocity survey, and the run string of production casing for a D3 oil well.

D3 zone of Devonian was topped at 5,250 ft., or 2,550 ft. subsea, and drill-stem tests in that section down to around 5,308 ft. gave up water-free oil. D2 zone was contacted at 5,010 ft., or 2,310 ft. subsea, and water-free oil showed to top of the green shale which was encountered at 5,121 ft.

Production string of casing is being run at the Davulco Group's second oil extension venture in the Camrose Viking sand oil area, and rig from that well will be shifted immediately for a third driller.

The extension success, 2 Davulco, on LSD 13, 15-47-20w4, located 1¼ miles southeast of the No. 1 oil extension, is owned by Davies Petroleums, Ltd., Vulcan Oils, Ltd., Hanna Petroleums, Ltd., and Siscoe Gold Mines, Ltd.

First drill-stem test to show free oil was run of the Viking interval 3,206-08 ft. Pipe recovery was 450 ft. of clean oil. Drill-stem test from 3,208-11 ft. gave up 625 ft. of oil and 60 ft. of salt water, while the last test, from 3,211-14 ft. showed a recovery of 90 ft. of oil and 900 ft. of salt water. Crew is now running string of production casing for completion.



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CANADIAN WILDCAT SUCCESSES

Chamberlain 1, LSD 10, 30-52-23w4, TD 3,789 ft., on pump production. Oil discovery in basal quartz sand.

British American-Cities Service 1 Hackett, LSD 13, 15-36-18w4, TD 5,866 ft. capped potential gas well.

CANADIAN WILDCAT FAILURES

Union-Seaboard-Federated 3 Amisk Lake, LSD 7, 7-64-17w4, TD 2,217 ft.

Socony 1 Buffalo, LSD 8, 6-103-16w5, TD 5,113 ft.

H.B-Union 1 East Peace River, LSD 9, 24-93-18w5, TD 5,705 ft.

Gulf 16 W. E. Porter, LSD 16, 31-41-18w4, TD 5,600 ft.

Trotter-McIntyre 1 Country Club, LSD 8, 15-52-25w4, TD 5,303 ft.

EASTERN CANADA

ONTARIO.—In Bruce and Huron counties, Ontario, leasing is being done by Sun Oil Co. north, west and south of Walkerton, with drilling planned for next spring. Acreage is being taken up in Greenock, Bruce, Kincardine, Culross, Kinloss and Huron townships, in Bruce County, and in Ashfield Township, Huron County. Reports of the department of mines and resources indicate possibilities in the Trenton limestone formation at comparatively shallow depth.

In Elgin County, Richfield Oil Co., drilling on the John A. McMillan farm, Concession 5, Aldborough Township, about 4 miles west of Rodney, has brought in a shallow oil well, with settled production indicated around 10 bbl. or better. A second well is being drilled.

Louisiana-Arkansas

Franklin County Wildcat Dually Completed for Gas

SHREVEPORT.—A dual completion gas well in Franklin County, northwest Arkansas, was brought in last week by the Arkansas Louisiana Gas Co. at its 1 Lain D. Morris, 330 ft. S and E of C 24-9n-29w, 3 miles northwest of Cecil field. Well was dually completed from the Morris and Atoka sands after drilling to 5,038½ ft.

An estimated 75,000 M.c.f. gas was produced from the Morris with closed pressure of 927 psi. and flowing pressure of 907 psi. on ⅜-in. choke. The Atoka produces an estimated 1,500 M.c.f. gas with closed pressure of 1,109 psi. and a flowing pressure of 266 psi. on ⅜-in. choke.

The California Co. is in the process of taking sidewall samples in its 1 P. D. Burton, Jr., et al, NE NE 9-18s-13w, Lafayette County wildcat, preparatory to running casing and testing the Cotton Valley.

The Cotton Valley produced some good shows from 7,335-55 ft. A drill-stem test of that section recovered 4,000 ft. of oil and gas and 40 ft. of oil-cut mud. Schlumberger was run to total depth of 9,564 ft. Findings have not been announced as yet.

McAlester Fuel Co. is preparing to make another drill-stem test on its A-1 Sam J. McCollum, C NW NE 22-19s-21w, Columbia County wildcat. The operator ran into trouble in the initial drill-stem test from 10,852-70 ft. in the Smackover when a packer failed after 4 minutes coming out and a valve cut out. Before the packer failure 3,200 ft. water cushion and 3,200 ft. gas-cut mud and an estimated 100 ft. of gas-cut mud were recovered.

Total depth drilled was 10,920 ft. in the Smackover. Wildcat was tested in the Pettit with recovery of 180 ft. of 37°-gravity oil and 40 ft. of oil and gas-cut mud.

From 10,870-10,920 ft. core samples were dense shaley limestone with some indications of odor.

In Union County the Martin Wunderlich 1 Reynolds-Gammill Lumber Co., 160 ft. W of C SW NW 36-16s-17w, is testing from perforations at 6,423-25½ ft. Test from per-

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forations at 6,421-22 ft. proved dry. Total depth is 6,586 ft. in the Smackover.

Louisiana.—A confirmation test will begin soon at Atlantic Refining Co. 1 Sarah F. Butts, recent Tuscaloosa oil discovery in Tensas Parish. New test spots in C SW NE 12-10n-10e, northeast diagonal offset to the discovery. Production will be sought to 9,500 ft. in lower Tuscaloosa.

Atlantic 1 H. T. Goldman, 1,947 ft. from S/L, 2,010 ft. from W/L 12-10n-10e, was the discovery well, located 1¼ miles northeast of Barcelona. Well produced from perforations in Tuscaloosa sand from 8,912-27 ft.

Stanolind Oil & Gas Co. 1 Nebo, 15-23n-12w, Bossier Parish wildcat, has been plugged back to 3,106 ft. from a total depth of 11,262 ft. in an effort to complete the test from the Tokio.

The discovery of a new producing formation for the Pine Island area, Caddo Parish, appears to be in the making with the completion of Halbouty and Greyhound Drilling Co. 1 Dr. T. B. Tooke, 18-20n-14w.

The well flowed 21 bbl. of oil per day on a ¼-in. choke from perforations between 3,706-17 ft. in the Kilpatrick sand of the Rodessa, after being acidized with 1,000 gal. acid.

If findings are officially confirmed, this will be the first Kilpatrick production for Pine Island. Most sources state that the only other Kilpatrick production in north Louisiana lies in the Haynesville field.

The wildcat is spotted about 2½ miles from Pine Island on southeast flank and 1 mile southwest of Belcher. The well may be called the discovery well for a new Caddo Parish field. It is more probable, however, that the well will be included in Pine Island as a new extension.

First test was made at 4,700 ft. in the Pettit, but following the recovery of only 25-30 bbl. oil per day, the wildcat was plugged back to Kilpatrick, total depth being 5,047 ft.

LOUISIANA WILDCAT FAILURES

Catahoula Parish: H. A. Harper et al 2 L. R. McGraw, 330 ft. N and 120 ft. E SWc 19-10n-9e, dry, TD 2,524 ft.

J. S. Michael 1 Nebo O. "P," 660 ft. N and W SEc 17-6n-6e, dry, TD 6,515 ft.

ARKANSAS WILDCAT FAILURE

Union County: Zach Brooks Drilling Co. 1 J. P. Pickering, C SE SE NW 1-17s-16w, dry, TD 3,400 ft., PBTD 2,174 ft.

Kansas

Two New Rooks Pools Placed on Production

ROOKS County has two new producing areas. One, designated as the Hillside pool, is located 4 miles northwest of the Webster pool, in the western part of the county, where Deep Rock Oil Corp. has completed its 1 Gosselin, SW SW SW 12-8-20, on the pump for a potential of 55 bbl. of oil per day. Production is from Toronto lime, topped at 3,206 ft. and opposite which casing is perforated at 3,204-14 ft. Hole, with casing run to 3,477 ft., is plugged back to 3,245 ft. from its original total depth of 3,492 ft. in Arbuckle lime, which failed to produce.

The other new area, designated as the West Chandler pool, is located a mile west of the Chandler pool, 10 miles to the southeast of the new Hillside pool, where Mid Plains Oil Corp. and Westgate-Greenland Oil Co. has completed its 1 Casey, NW NW SW 15-9-19, as good for 41 bbl. of oil per day on the pump. Its production is from Lansing lime, topped at 3,264 ft., and opposite which casing is perforated at 3,232-56 ft. Hole was plugged back to this zone from a total depth of 3,511 ft. in Arbuckle, topped at 3,505 ft.

Stanolind Oil & Gas Co. has a possible new discovery well at its 1 Stos, NW NE NE 18-17-15, 5 miles southwest of Leoville pool, Barton County. It found oil showings in Lansing lime, topped at 3,546 ft. One drill-stem test, open 60 minutes, and taking in an interval at 3,548-53 ft., got 1½ ft. of clean oil with 13 ft. of mud. Another test, taking in an additional 8 ft. to 3,561 ft., and open the same time, got 50 ft. of oil-cut mud. A similar test with hole deepened to 3,580 ft., and taking in an interval below 3,568 ft., got 3 ft. of clean oil with 7 ft. of mud. Hole has been drilled into the Arbuckle lime, topped at 3,614 ft. but tested sulfur water in that zone.

New wildcat tests being started include one in western Jackson County, in the northeastern part of the state, in the Forest City basin. It is being drilled by Skelly Oil Co. on a promising block 10 miles southwest of Holton with location in the NE NW NW 14-7-13e, on the company's Beightell lease. Jackson County, so far unproductive and little explored, is just east of Pottawatomie County and northeast of Wabaunsee County, two Forest City basin counties which experienced an active exploratory play during 1949 and early 1951.

KANSAS WILDCAT SUCCESSES

Decatur County: Continental Oil Co. 1 Gillespie, NE SE NE 34-5s-27w, 1,192 bbl. 39°-gravity oil from 3,632-50 ft., 3,664-86 ft., 3,702-38 ft., 3,750-62 ft., 3,805-20 ft., TD 4,075 ft. (Pool named Adell, northwest).

Meade County: Deep Rock Oil Corp. 1 Horner, C NW NW 29-33s-26w, 11,000 M.c.f. gas from 5,743-58 ft., TD 7,731 ft.

Stafford County: Stanolind Oil & Gas Co. 1 Taylor, NE NE NW 15-21s-14w, pumped 104 bbl. oil from 3,682-88 ft. in Lansing-Kansas City, TD 3,741 ft., PBTD 3,696 ft. (Pool named Taylor).

KANSAS WILDCAT FAILURES

Barton County: Sohio Petroleum Co. and B&R Drilling Co. 1 Hitchman, NW NW NW 1-17s-12w, dry, TD 3,450 ft.

Northern Ordnance 1 Schreiber, NE NE NE 33-17s-15w, dry, TD 3,632 ft.

Butler County: Wixson Drilling Co. et al 1 Langley, NE NW SW 33-23s-3e, dry, TD 2,946 ft.

Clark County: Stanolind Oil & Gas Co. 1 Santee, SE SE SE 18-33s-23w, dry, TD 5,650 ft.

Skelly Oil Co. 1 Dunne, SE SE NW 4-35s-23w, dry, TD 6,000 ft.

Cowley County: K. T. Wiedemann 1 Kittleson, SE NW NE 25-32s-3e, dry, TD 3,580 ft.

Ellis County: V. D. Sidey 1 Gasaway "B," NW SW NW 12-11s-19w, dry, TD 3,646 ft.

Anderson-Prichard Oil Corp. 1 Arnold, NW NW NW 17-15s-16w, dry, TD 3,523 ft.

Ellsworth County: Coffman, Blair & Ward 1 Westerman, CSL NE NW 15-16s-8w, dry, TD 3,070 ft.

Duke & Wood Drilling Co. 1 Worl, NW NW NE 31-17s-7w, dry, TD 3,435 ft.

Graham County: Peel-Hardman 1 Miller, SE SE SW 5-9s-21w, dry, TD 3,880 ft.

McPherson County: H. K. Lindsley et al 1 Koehn, NE NE NE 26-20s-2w, dry, TD 2,999 ft.

Ness County: B&R Drilling Co. 1 Schwein, SW SW SW 18-20s-21w, dry, TD 4,515 ft.

Norton County: Jones, Shelburne & Farmer, Inc., 1 Dwyer, SE SE NE 26-5s-24w, dry, TD 3,970 ft.

Pawnee County: Vickers Petroleum Co., Inc., 1 Gustafson, SW SW SW 10-20s-16w, dry, TD 3,789 ft.

Rooks County: Dizdar Investment Co. 1 Ganoung, NE NE NW 20-9s-17w, dry, TD 3,620 ft.

Russell County: Anderson-Prichard Oil Corp. 1 Cook, SE SE NE 24-11s-15w, dry, TD 3,475 ft.

Sedgwick County: Lindas Oil, Inc., 1 Chesney, SE NW SE 23-28s-4w, dry, TD 3,105 ft.

Seward County: Huber Corp. 1 Wallace "A," C SE NW 13-35s-32w, dry, TD 6,103 ft.

Stafford County: Ferrell Drilling Co. 1 Bledsoe, NW NE SE 21-21s-14w, dry, TD 3,810 ft.

Trego County: Aurora Gasoline Co. 1 Osborn "A," SW SW NE 9-11s-21w, dry, TD 3,845 ft.

Aurora Gasoline Co. 1 Osborn-Monroe "A," SW SW SE 21-11s-21w, dry, TD 4,070 ft.

California

Normal Activity Returns After Disastrous Rains

LOS ANGELES.—California drilling activity was coming back to somewhere near normal after hard rains throughout the oil regions had caused operators to suspend drilling at many wildcat and field wells. Exploratory operations were of course hardest hit, but in many mountainside fields the rain-caused slides made travel impossible. Spudding of several wildcats in isolated areas will be delayed for some 2 weeks because of water-soaked roads and fields.

In recent months California oil operators have been showing increased interest in developing additional gas reserves in northern counties. With some 800,000 M.c.f. of Texas gas being brought into the state daily a ready market exists for any new local sources.

One of the latest large acreage deals in that area was the acquisition by Richfield Oil Corp. of about 43,300 acres in Sutter County. The two community leases, covering the entire Buttes area west of Marysville, were acquired from Buttes Oilfields, Ltd. The latter retained a one-half override on any new profits resulting from Richfield's operations on the properties.

First test to be drilled will be Richfield 1 Butte Community-A in SE 9-16n-2e. It will be about 7 miles southeast of the Buttes Creek discovery of Honolulu Oil Corp., completed in August of last year at 3,292-3.3-4 ft. for 3,400 M.c.f. daily. Richfield is to do extensive geophysical work and start the wildcat before April 12.

In San Joaquin Valley a test shortly will get under way about midway between the Buttonwillow and Bowerbank gas fields. E. A. Bender has staked location for 37-A K.C.L. in 23-29s-23e, or directly on the trend established by the two fields. Bender recently obtained leases from Kern County Land Co. totaling 840 acres, in Sections 23, 24, and 25.

B. B. Breckenridge 1 Georgeson, about ⅝ mile northwest of the Camden field in Fresno County, was being placed on the pump after a formation test at 5,990-98 ft. showed the wildcat might make a 100-bbl. well. Drilled to 6,288 ft. the wildcat, located in SW NW 31-16s-20e, yielded water through perforations at 6,055-62 ft. Through perforations at 5,942-50 ft., another test resulted in the recovery of high-gravity oil.

With casing set at 12,006 ft. in its Blackwells Corner wildcat, The Texas Co. continued to test shows. Production tests through perforations at 11,690-11,740 ft. and 11,770-11,800 ft. recovered water. Located in 8-27s-20e, or about 2 miles northwest of North Belridge production, the wildcat was the company's 1 Occidental Land Co.

Maintaining its recently acquired reputation as the state's most active wildcatter, The Texas Co. has staked two new wildcats. In the Ballinger Canyon area of Cuyama Valley, 1 Blue Diamond was staked in NE SE 10-9n-24w. In Imperial County and north of the Superstition Mountain area, 1 Stipek was located in SW SW 4-14s-12e. The new wildcat falls about midway between the dry hole it drilled near Calexico and its current test 40 miles northwest. The latter, Texaco 1 Pure (NCT-1) in 31-11s-10e, was drilling at about 3,800 ft. at last reports.

CALIFORNIA WILDCAT FAILURES

Fresno County, Carruthers area: Coast Exploration Co. 73 "Well," 28-16s-19e, dry, TD 6,516 ft., elev. 234 ft.

Kern County, McDonald Anticline area: Murphy Bros., Ltd., 2 M.S.T. Theta, 2-28s-19e, dry, TD 1,112 ft., elev. 1,025 ft.

Kings County, Corcoran area: General Pe-

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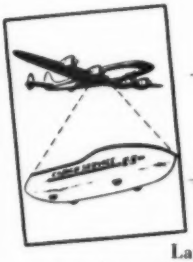

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troleum Corp. 36-4 Richardson, 4-21s-21e, dry, TD 12,064 ft., elev. 188 ft.

Los Angeles County, Castaic Junction area: Humble Oil & Refining Co. 2 Newhall Corp., 24-4n-17w, dry, TD 12,634 ft., elev. 1,378 ft.

Lancaster area: H. W. Shaffer 1 Munz, 9-7n-14w, dry, bottomed in weathered granite, TD 4,428 ft., elev. 2,596 ft.

Orange County, Talbert area: Rancho Oil Co. 1-6 Lamb, 6-6s-10w, dry, TD 5,900 ft.

Santa Barbara County, Tepusquet area: British-American Oil Producing Co. 1 British-Honolulu-Rancho Suey B, 5-10n-32w, dry, TD 4,070 ft., elev. 1,483 ft.

Oklahoma

Beaver County's Wet Gas Strike Continues Tests

PURE OIL CO. is continuing production tests of its prospective Morrow sand gas-distillate discovery well in northeastern Beaver County, in the Oklahoma Panhandle. The well, 1 Akbert, located about 3 miles northwest of Knowles in the SE SE SW 16-5n-26e, and about 16 miles northeast Flynn Oil Co.'s recently completed Marmaton lime oil discovery, north of Beaver, flowed 1,885,000 cu. ft. of wet gas per day on a late gage, after flowing at an estimated rate of 4,000,000 cu. ft. per day in an initial test before setting separators. Present depth is 7,020 ft. with pay open below 6,718 ft., bottom of casing.

In the meantime, another Beaver County wildcat, located north of Mocane and 8 miles northwest of the Pure discovery, has proved a failure. It is R. E. Adams 1 XIT Ranch, in the C NW SW 19-6n-25eCM, drilled to 6,492 ft. without showings of importance. Sunray Oil Corp., however, is continuing to make hole at its 1 Meyer, C NW SW 16-1n-21eCM, southwestern Beaver County wildcat, drilling below 7,600 ft. Latest addition to wildcatting in the county is a test which Emby Kaye is drilling at 1 Sharp, C SE SE 31-6n-22eCM, 3½ miles southeast of production of the Light Ranch gas-distillate field, in the northwestern part of the county.

Stanolind Oil & Gas Co. has placed its new Springer sand discovery well in the Gotebo area, northeastern Kiowa County, southwestern Oklahoma, on the pump for completion. This well, 1 Kennedy, SE NE NW 2-7n-16w, 2 miles northeast of Gotebo, pumped 124 bbl. in the first 15 hours, and 179 bbl. in the next 24 hours. Production is from casing perforations at 5,050-92 ft. Five tests are now drilling within a radius of 2 miles of this discovery, making this one of the livest wildcat areas in the state.

Carter Oil Co. has uncovered what appears to be a new Bromide pool in Garvin County at its 1 Rossier-McCaskill, NW NW NE 28-3n-2w. Location is about a mile south and a little west of Antioch, and although only ¾ mile east of production of the Southwest Antioch pool, it is separated from that pool by dry holes. The Bromide dense section was logged at 6,632 ft. Good oil recoveries were made in two drill-stem tests in saturated Bromide sand, the first at 6,843-60 ft. and the second at 6,857-83 ft. The first got gas in 9 minutes and yielded 990 ft. of oil and 30 ft. of oil and gas-cut mud; the second flowed gas in 5 minutes and filled 5,600 ft. of clean oil with an additional 70 ft. of oil and gas-cut mud. In both cases, the tester was open 60 minutes.

A rank wildcat being drilled by Stanolind Oil & Gas Co. near Silo, in northwestern Bryan County, southern Oklahoma, also is reported to have had good porosity and oil staining in Bromide sand. It is that company's 1 Barakat, SE SE NE 7-6s-8e. Location is about 5 miles southeast of the Cumberland field, on the Marshall-Bryan county line. The well is being drilled "tight," but total depth is reported as 7,546 ft. with top of the Bromide zone at 7,180 ft., the first Bromide sand at 7,412 ft., and the second Bromide sand at 7,453 ft. The hole is one which Stanolind took over at 5,743 ft. after it previously had been abandoned at that depth.

Howell & Howell and associates also are reported to have had oil showings in their deep wildcat test, 1 Flynn, C SE SE 27-11n-23w, 6 miles north of Sayre in northern Beckham County, in the extreme western part of the state. Bottom is at 14,257 ft. with sand from 14,237 ft. At latest report operators were preparing to run drill-stem test.

A confirmation of the recent discovery of McLish sand production in the old Moore field, Cleveland County, is in prospect at Anderson-Prichard Oil Corp. 1 Fant, C NW NW 27-10n-2w, which got 540 ft. of clean oil and 360 ft. of oil-cut mud in a 60-minute drill-stem test at 7,745-87 ft. in that pay zone. Hole is being cored ahead. Location is about a half mile southeast of the McLish sand discovery well, Sinclair Oil & Gas Co. 5-A Franklin, completed last October. Previous production in the Moore pool had been from the Wilcox.

OKLAHOMA WILDCAT SUCCESSES

Grady County: Magnolia Petroleum Co. et al 1 Woodruff, C NW NW 13-4n-5w, flowed 136 bbl. 41.8°-gravity oil from Hart at 8,960-92 ft., TD 10,012 ft., PBTD 9,016 ft.

Logan County: Powell Briscoe, Inc., 1 Frances Ploeger, SE SE NW 27-15n-4w, flowed 25 bbl. 60°-gravity distillate and 1,000 M.c.f. gas from Mississippi lime at 6,410-85 ft., TD 7,174 ft., PBTD 6,485 ft.

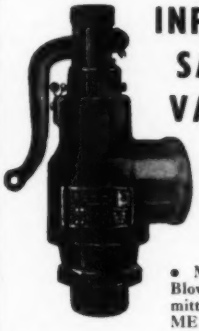
OKLAHOMA WILDCAT FAILURES

Cleveland County: Wilbur Keith 1 Gross, NW NW NW 9-9n-3w, dry, TD 10,070 ft.

Comanche County: J. C. Owens 1 Grady Ray, SW SW NE 22-1n-10w, dry, TD 432 ft.

Cotton County: C. W. & W. L. Snoddy 1 R. R. Ziebold, SW SW SW NW 23-4s-12w, dry, TD 1,800 ft.

Garfield County: C. W. Smith and D. L.



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Husted 1 Cassady, SE SE NW 35-22n-3w, dry, TD 2,364 ft.

Grant County: The Texas Co. 1 Leaham, NW NW NW 24-27n-4w, dry, TD 5,512 ft.

Le Flore County: Athletic Mining & Smelting Co. et al AP-1 Hickman, N/2 S/2 NW 17-8n-25e, dry, TD 7,650 ft.

Lincoln County: K. A. Ellison and Sinclair 1 Harris, SW SW SW 22-15n-2e, dry, TD 5,416 ft.

Love County: Sinclair Oil & Gas Co. 1 St. John, SW NE SE 36-6s-2w, dry, TD 9,995 ft.

Noble County: Davidor & Davidor 1 Wilkins, NW NW SE 30-24n-1w, dry, TD 4,474 ft.

Okfuskee County: L. L. Jones 1 Jones, NE SE NW 1-12n-9e, dry, TD 2,755 ft.

Woods Oil & Gas Co. 1 Adams, SW SW SE 2-12n-7e, dry, TD 4,512 ft.

Osage County: W. R. Dillard 1, SW SW SW 21-25n-7e, dry, TD 2,717 ft.

Pawnee County: Stephens Petroleum Co. 1 Guthrie, SW SW SE 14-22n-4e, dry, TD 3,492 ft.

Payne County: United Transports, Inc., and C. E. McCaughey 1 Howland, C NW NW 21-18n-1w, dry, TD 5,560 ft.

Pottawatomie County: Sunray Oil Corp. 1 Kelley, NE NE SE 26-7n-2e, dry, TD 5,505 ft.

G. L. Reasor 1 Sims, NE NE SE 22-11n-2e, TD 6,083 ft.

Stephens County: C. V. Richardson et al 1 Crews, SE SE NW 2-1s-8w, dry, TD 5,008 ft.

Permian Basin

Glasscock County Well Said to Be Record

MIDLAND.—Week's developments brought in an exceptional producer for the tight Spraberry sand, said to be a record well; and several extensions, one being a connection well between the Germania and Tex-Harvey fields.

The record well was Sinclair Oil & Gas Co. 2 J. B. Calverley, located on the northeast side (1¾-mile stepout) of the Driver field in southwest Glasscock County. Top of the Spraberry was 6,835 ft., on elevation of 2,683 ft., and total depth was 6,902 ft. Following a fracture treatment of the open hole, the well gaged 1,191 bbl. of 35°-gravity oil in 24 hours through open 2-in tubing, with gas-oil ratio of 980 cu. ft. At the end of the 24-hour period the well was flowing steadily at the rate of 49.5 bbl. an hour.

Completion of Texas Crude Co. 1-20 Andrew Fasken in 20-36-T2S-T&P, Midland County, marked a step toward closing the undrilled area between the Germania and Tex-Harvey Spraberry fields. Final gage on the well was 654 bbl. of 36°-gravity oil a day through ½-in. choke, from perforations at 7,230-65 ft.

In northwest Reagan County, upper Spraberry production was extended 1½ miles southeast at Tide Water Associated Oil Co. 1-A Schwartz, 29-36-T5S-T&P. Potential was 279 bbl. of 38°-gravity oil a day through 1-in. opening, from perforations at 6,715-6,800 and 6,845-6,900 ft. Location is a northwest offset to Sohio Petroleum Co. 1 Proctor in Section 32, which was the first lower Spraberry producer in that area.

The Hi-Lonesome field southwest of Midland, which has three wells and as many pay sections, has prospects of a second well in the Wolfcamp. The new prospect was The Texas Co. 2-D Scharbauer, south of the Pennsylvanian discovery and a northwest offset to the field's Wolfcamp discovery. Drill-stem test in the 2-D at 9,815-10,075 ft., tentatively identified as between the Wolfcamp and Pennsylvanian, had a good volume of gas in 8 minutes and recovered 200 ft. of drilling mud, 360 ft. of oil-cut mud, 180 ft. of oil and gas-cut mud, and 5,800 ft. of clean oil. Time on the test was 8 hours. The well was originally a Spraberry test, which found that zone nonproductive.

Some leasing activity has been reported in Presidio County, with Sun, Sinclair Oil & Gas Co., Argo Oil Corp., Magnolia Petroleum Co., Continental Oil Co. and others said to be participating.

According to the report, Stanford Research Institute of Stanford University had a seismograph crew in Marfa to do surface shooting on the leases of Lewis Welch, California oil operator, which also extend into Jeff Davis County.

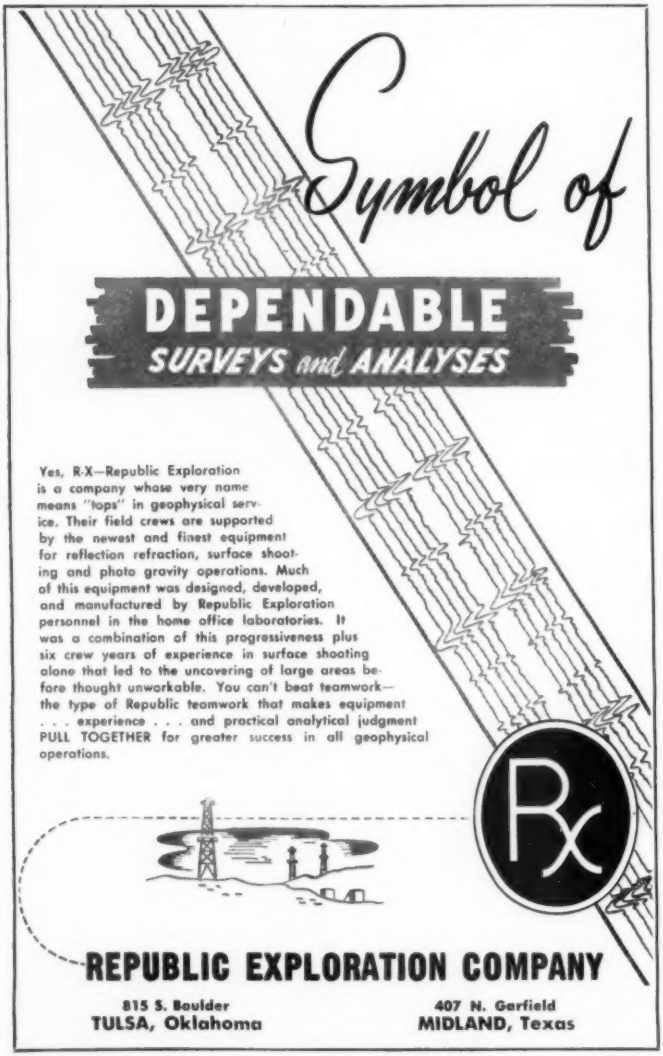
Correlation of the work by Stanford and previous seismograph studies was expected to result in the location of a deep wildcat test.

In Midland County, Blackwood & Nichols continued testing in the Devonian at 1 Moss. Perforations at 11,923-50 ft. were to be squeezed and further tests made in the top of the Devonian from 11,855-95 ft. Acid treatment on perforations at 11,923-50 ft. yielded 5 bbl. of fluid an hour, swabbing, with only a trace of oil.

Superior Oil Co. 4-16 Windham, wildcat north of the Pegasus field, reported top of the Pennsylvanian at 10,128 ft., and minus 7,272 ft. It was drilling ahead at 10,227 ft.

Gulf Oil Corp. 1-NN University, Andrews County wildcat, recovered additional oil on a second drill-stem test. First test, in top of the Ellenburger from 12,502-19 ft., recovered 2,960 ft. of oil, with no water. Second test from 12,545-96 ft., open 2 hours, developed 5,554 ft. of clean, 43°-gravity oil, plus 180 ft. of heavily oil-cut mud, with no water.

The Wilshire-Ellenburger field of Upton County gained four wells this week. In Section 119, Standard Oil Co. of Texas 11-119 McElroy gaged 1,996 bbl. of oil in 15 hours from pay at 12,283-12,424 ft. Standard 12-118 Windham, Section 118, gaged 1,831 bbl. of oil in 12 hours from pay at 12,238-12,380 ft.; Wilshire Oil Co. 13-129 McElroy, Section 129, flowed 624 bbl. of oil through open tubing in 8 hours, from pay at 12,250-12,400 ft., and Wilshire 14-118 Windham, Section 118, gaged 1,829 bbl. of oil through open tubing in 12 hours, from pay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at 12,230-12,375 ft. Tubing choke on the first two wells was ¾-in.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT SUCCESSES

Pecos County: R. H. Henderson 1 Robertson, 7-112-TCRR, TD 2,300 ft., elev. 2,630 ft., shot 2,240-80 ft., IP pumped 5 bbl. 26°-gravity oil.

R. H. Henderson 1 Burton, 3-112-TCRR, TD 2,418 ft., elev. 2,618 ft., pay 2,350 ft., IP pumped 6 bbl. 26°-gravity oil.

Reagan County: Indian Royalty Co. 1 P. Roberts, 36-37-T5S-T&P, TD 6,991 ft., elev. 2,670 ft., Spraberry pay 6,770 ft., IP 417 bbl. 39°-gravity oil, ½-in. choke, TP 150 psi., GOR 546 cu. ft.

Tom Green County: The Texas Co. 1 Bubenik, Wilhelm Lauders Sur. 826, TD 5,483 ft., elev. 1,980 ft., pay 5,440 ft., IP 32 bbl. 30°-gravity oil, 17/64-in. choke, TP 175 psi., GOR 250 cu. ft.

Upton County: Barnett, Sears & Young 1 Annie Weekes, 1-K-Puerta Tierra Irrigation Co., Sur., TD 7,225 ft., elev. 2,743 ft., Spraberry 7,054 ft., pay 7,065 ft., IP 159 bbl. 36°-gravity oil, 24/64-in. choke, TP 75 psi., GOR 523 cu. ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Coke County: W. M. & A. P. Fuller 1 Waldrop, 340-1A-H&TC, dry, TD 6,554 ft., Capps 5,497 ft.

Dickens County: Placid Oil Co. 1 John Emery, 262-L-H&GN, dry, TD 7,857 ft., elev. 2,284 ft., Wolfcamp 4,090 ft., Canyon lime 6,800 ft., Mississippian 7,312 ft., granite wash 7,790 ft.

Gaines County: Stanolind Oil & Gas Co. 1-A Northrup, 37-H-D&W, dry, TD 9,012 ft., elev. 3,193 ft., Spraberry 7,100 ft., reef 8,987 ft.

Irion County: Carper Drilling Co. 1 Homer I. Bryant, Chas. Kaiser Sur. 729, dry, TD 1,005 ft.

The Texas Co. 1 Abe Mayer, John Dunman Sur. 1,802, dry, TD 1,028 ft.

Kent County: Callery & Hurt 1 R. L. Frost-2, 382-2-H&TC, dry, TD 7,404 ft., elev. 2,145 ft., Strawn 6,500 ft., Caddo 6,890 ft., Mississippian 6,950 ft., Ellenburger 7,140 ft.

The Texas Co. 1 Emery Est., 24-2-H&GN, dry, TD 7,294 ft., elev. 2,219 ft., reef 6,114 ft.

McCulloch County: W. A. & Clinto Lankford 1 Bill Lankford, A. Zahn Sur. 797, dry, TD 406 ft.

Pecos County: Leland Thompson, Jr. 1 J. A. McDonald, 45-12-H&GN, dry, TD 5,100 ft., elev. 2,552 ft., San Andres 1,710 ft.

Reagan County: Morgan Drilling Co. 1 J. D. Sugg, 211-2-T&P, dry, TD 6,907 ft.

Stanolind Oil & Gas Co. 1 G. F. Roach, 190-2-T&P, dry, TD 6,743 ft., elev. 2,630 ft., Spraberry 5,722 ft.

Stanolind Oil & Gas Co. 1-A Sowall, 214-2-T&P, dry, TD 8,700 ft., elev. 2,660 ft., Spraberry 5,884 ft., Dean 7,350 ft.

Runnels County: Southern Minerals Corp. 1 R. H. Herring, Jr., Sec. 434, J. B. La-Garza Sur., dry, TD 4,336 ft., Kink 3,149 ft., Palo Pinto 3,626 ft., Caddo 4,299 ft.

Sterling County: Parochial Petroleum Co. 3 Mrs. H. Babe, 22-22-H&TC, dry, TD 4,424 ft., elev. 2,640 ft., Clear Fork 2,398 ft., dolomite 3,300 ft.

Sutton County: Tubb-Gann Drilling Co. 1 Gibbs, 18-A-GWT&P, dry, TD 327 ft.

Upton County: Delta Drilling Co. 1 J. H. Carter, 25-B-HE&WT, dry, TD 11,831 ft., elev. 2,603 ft., Spraberry 6,550 ft., Strawn 9,322 ft., Mississippian 10,244 ft., Devonian 10,370 ft., Simpson 11,140 ft., Ellenburger 11,565 ft.

TEXAS PANHANDLE

AMARILLO.—Gray County activity is again forging ahead with two wells, one a wildcat and the other an extension, showing good evidence of gas production. The wildcat, Phillips 1 Hobart Ranch in the north central part of the county, had 1,750,000 cu. ft. of gas and 7 bbl. of oil on 24-hour blowdown test. More perforating and testing is in progress at depths below 7,800 ft., where numerous oil and gas shows were recorded. The Hobart is an Anadarko Basin edge well drilled as a 7-mile stepout from Panhandle field shallow production. Total depth is 10,001 ft.

In the Wheat area of southwestern Gray County the Phillips 1 Giles "A," most southeasterly well of the Panhandle field extension, made a test of 3,141,000 cu. ft. of gas after acidization at plug-back total depth of 2,684 ft. in dolomite. Further acidization is in prospect before completion.

Top of the Morrow has been found at 9,862 ft. in the Sinclair 1 Hoover in Ochiltree County, and a drill-stem test is currently being taken from 9,865-9,927 ft. to test a gas show recovered from the formation. The Hoover is an Anadarko Basin wildcat located 4 miles northeast of The Texas Co. 1 Flowers, recently completed test which produced 87 bbl. oil per day on pump.

(Continued on page 139)

Appalachian-Ohio

Large Oil Well in West Virginia Is Completed

PITTSBURGH.—In Sherman district, Calhoun County, West Virginia, Dodd Oil & Gas Co. completed a large oil well, 7 Hunter M. Bennett, gaging 100 bbl. per day, total depth 2,115 ft. Big Creek district, McDowell County, Godfrey L. Cabot, Inc., 49-1350 Pocahontas Land Corp., resulted in 1,917,000 cu. ft. gas, Berea sand, total depth 4,330 ft. Baileysville district, Wyoming County, United Producing Co., Inc., 1870 W. M. Ritter Lumber Co., resulted in 1,286,000 cu. ft. gas, Berea sand, total depth 3,601 ft. Harts Creek district, Lincoln County, United Fuel Gas Co. 6852 fee, tested 1,047,000 cu. ft. gas, Brown shale, total depth 3,510 ft.

Garrett County, Maryland, New York State Natural Gas Corp. 1N-240 John K. Shaw, elevation 2,455 ft., resulted in a small gas well testing 11,000 cu. ft. gas, chert 3,705 ft., gas 3,722-24 ft., Oriskany sand 3,825 ft., total depth 3,962 ft. Loch Lynn Corp. 1 Nellie Lee, elevation 2,416 ft., is drilling at 3,426 ft. The Tully was recorded at 2,822 ft. and the chert at 3,404 ft.

In Unity Township, Westmoreland County, Southwest Pennsylvania, Peoples Natural Gas Co. 4003 A. J. Dotterway, elevation 2,094 ft., is drilling at 4,654 ft. South Buffalo Township, Armstrong County, Pittsburgh Plate Gas Co. 2-839 Mary A. McGinley, elevation 1,153 ft., which reached a depth of 6,936 ft. before fishing operations began, is drilling in the new hole at a depth of 6,568 ft. Napier Township, Bedford County, South Penn et al-Snee & Eberly 1 Jesse B. Miller, elevation 1,666 ft., is bailing after acidizing.

MARYLAND WILDCAT SUCCESS

Garrett County: New York State Natural Gas Corp. 1-N-240 John K. Shaw, elev. 2,455 ft., 11,000 cu. ft. gas, chert 3,705 ft., gas 3,722-3,724 ft., Oriskany sand 3,825 ft., TD 3,972 ft.

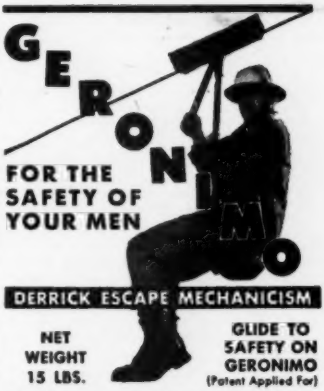
OHIO

The Waverly Oil Works extended the old Ewing pool in Washington Township, Hocking County, ½ mile to the west with a fair gasser on 1 H. W. Davis, Section 4. Clinton sand, topped at 2,760 ft. gaged 500,000 cu. ft. natural at 11 ft. in and will be drilled to 2,775 ft. and tubed.

In Coshocton County, the Preston Oil Co. 4 Charles Richards, third quarter, New Castle Township, made 60 bbl. natural from sand at 3,317-67 ft. and will not be shot until later. In Tiverton Township, the Wiser Oil Co. 1 Bernard Devore, Section 5, ¼ mile north of the 1 Giague, gaged 310,000 cu. ft. natural and will probably be shot.

OHIO WILDCAT SUCCESS

Washington County, Watertown Township: B. H. Putnam et al 1 Arnold (Klinger), Lot 60, Oriskany 4,348-78 ft., 2,600 M.c.f. gas, TD 4,399 ft.



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Central Area

ILLINOIS

Testing Benoist sand, Joe and William Slivka swabbed 75 bbl. of oil per day at their 1 Dare, NE SW SE 10-3s-2e, a wildcat in the area 3 miles southwest of Mount Vernon, Jefferson County. Nearest other production is in the Williams pools, 1 mile to the northeast. Pay is open at 2,490-99 ft., where an alloy section had been run in the casing string. The well, drilled to a total depth of 2,814 ft., previously tested Rosiclare lime at 2,643-53 ft., the O'Hara at 2,629-39 ft., and the Renault at 2,542-48 ft., without getting production. Hole is plugged back to 2,501 ft. The Benoist zone was shot with 30 quarts.

Production of the one-well Fairfield East pool, 1¼ miles east of Fairfield, Wayne County, is being extended southeastward by a 60-bbl. pumper being completed by Stanford Oil Co. at its 1 McGehee, NW SW NE 4-2s-8e. Pay is in the Aux Vases zone, productive horizon of the Fairfield East pool, at 3,132-47 ft. with bottom still in sand. Pay was shot with 40 quarts, and produced at the rate of 2 bbl. per hour.

George Aubrey and associates 2 Manker, which opens a new Cypress sand producing area in the Clay City-Noble Consolidated pool, swabbed 90 bbl. of oil per day while testing that pay, logged at 2,650-75 ft. (total depth). Location of the well is in the SE NE SE 17-3n-8e, just north of the Clay City townsite. Although in an old producing area, it is a mile from nearest Cypress production.

Superior Oil Co. is adding an exceptionally good producer for the recently opened Zenith North pool, 4 miles southwest of Flora, in Wayne County, where its 1 Moore, N½ SE SE NE 21-2n-6e, pumped and flowed at the rate of 750 bbl. of oil per day. Production is from both the Rosiclare and McClosky zones at a total depth of 3,181 ft. Location is ½ mile northeast of the discovery well, producing from the same horizons.

INDIANA

A new gas producing area, located more than 15 miles from any other production, has been opened in the northwest corner of Greene County. The discovery well, F. L. Lyons 1 McHenry, SE SE NE 11-8n-7w, flowed 1,000,000 cu. ft. of gas per day from Devonian lime at 1,722-37 ft. Bottom of the hole is in Silurian at 1,765 ft. The area is about 1½ miles southwest of Howesville (southern Clay County), and about 2 miles southeast of Jasonville. It has been designated as the Howesville pool.

WESTERN KENTUCKY

Great Lakes Carbon Co. 1 Burton, a wildcat in 7-Q-27, in the northwest tip of Daviess County, near the Henderson County line, had 275 ft. of gas, 75 ft. of clean oil, and 10 ft. of mud-cut oil in the pipe following a 75-minute drill-stem test of a prospective Rosiclare lime pay zone at 1,838-59 ft. With hole deepened to 1,929 ft., casing has been run through both the Rosiclare and McClosky zones. Location is northeast of production in the Reed area of northeastern Henderson County.

George & Wrather and associates are confirming their recent discovery of Rosiclare production in the area 5 miles southeast of Sebree in the northeastern tip of Webster County. Their 2 Mahurin-Luck, 915 ft. southwest of their discovery well on the same lease, in 2-M-25, flowed gas in 10 minutes and filled 300 ft. of clean oil and 120 ft. of mud and gas-cut oil in a 60-minute drill-stem test at 2,694-2,706 ft. Operators logged the Rosiclare pay at 2,699-2,709 ft. Deepening after the Rosiclare test, they found additional showing in McClosky lime at 2,716-22 ft. and 2,779-87 ft. Bottom of hole is 2,798 ft. with casing run through both zones.

EASTERN KENTUCKY

Rain and mud have combined to cut drilling activity to a minimum in the eastern Kentucky hills. Routine drilling and exploration continues in the Big Sandy gas field where some 50 rigs are active. This work is spread over several counties and is largely in proven or semiproven territory.

First commercial production for Greenup County seems likely after acidization of Van Everman 1 James West Floyd located in 19-X-79 in the southern portion of the county. Corniferous lime, topped at 1,328 ft. and drilled to a total depth of 1,337 ft., was stage treated with 500 and 650 gal. of acid. Hole filled 650 ft. with oil and operators are running rods and tubing for pumping test.

MICHIGAN

Development of a new (or perhaps it will be called the revival of an old) Dundee oil pool in Winterfield Township, Clare County, appeared to be almost assured as Louis Rose was flowing one well from that zone at a restricted rate of 5 bbl. of oil an hour natural, and Sun Oil Co. was flowing another well at the rate of 50 to 60 bbl. of oil a day from the Dundee, and from between the 5-in. and 7-in. casings while tests of the Richfield horizon were in progress at this same well.

Rose 1 Tope, N½ NW NE 12-20n-6w, Winterfield Township, a Cranberry Lake well which was drilled to the Dundee, showed oil pay, was acidized into water, then plugged back, whipstocked and redrilled to this same objective, flowed 115 bbl. of oil natural in 15½ hours before being pinched back to 5 bbl. an hour. Dundee was logged at 3,815 ft. and hole was drilled to either 3,823, or possibly only to 3,818 ft., total depth. Cable tool drillers lost their measurements and amount of hole drilled while cleaning out and exact total depth will not be checked until well quits flowing.

Meanwhile, while Richfield objective was

(Continued on page 138)

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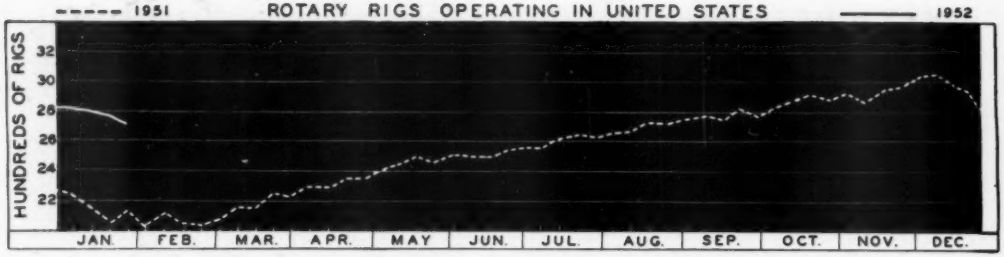
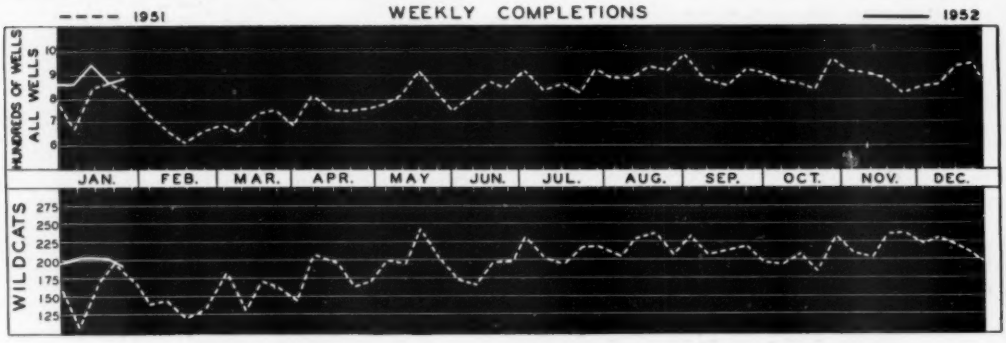




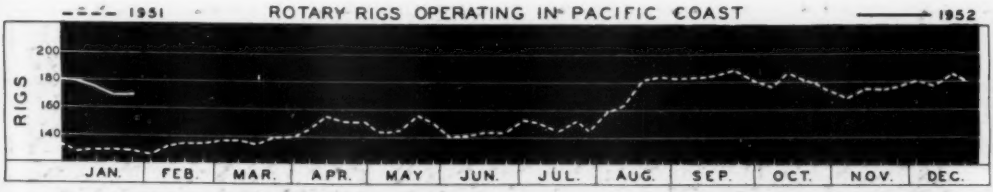
CURRENT STATISTICS

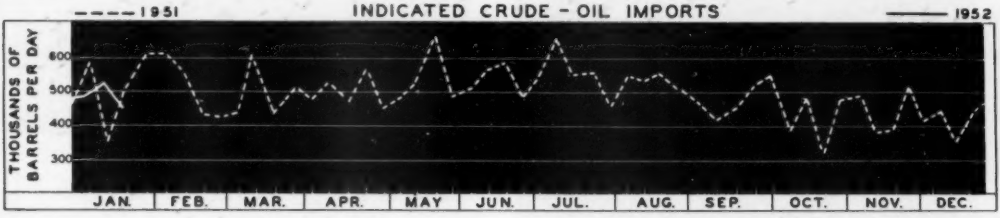
EXPLORATION

WEEKLY WELL COMPLETIONS . . . WEEK ENDED JANUARY 26, 1952

	Total of all wells					Jan. 26		Wildcat completions and discoveries									
													Cumulative total, 1952				
	Comp.	Oil	Gas	Dry	Footage	1952	1951	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	6	4	0	*2	9,000	26	31	0	0	0	0	0	0	0	0	0	0
Pennsylvania	31	12	8	†11	50,020	112	61	0	0	0	0	0	0	0	0	0	0
West Virginia	21	3	17	1	61,100	57	49	0	0	0	0	0	0	0	0	0	0
Ohio	11	5	2	4	30,947	59	61	0	0	1	0	1	0	0	1	0	1
Indiana	12	5	2	5	17,238	68	89	0	0	1	2	3	4	0	1	22	27
Kentucky	32	13	8	11	64,363	96	75	1	0	0	3	4	2	0	0	12	14
Illinois	13	6	0	7	31,690	108	167	0	0	0	3	3	0	0	0	27	27
Michigan	11	2	0	9	27,942	41	46	0	0	0	7	7	4	0	0	16	20
Kansas	100	45	5	50	350,444	396	302	2	0	1	22	25	8	0	1	83	92
Nebraska	6	3	0	3	31,466	26	28	0	0	0	2	2	1	0	0	17	18
Oklahoma	131	68	5	‡58	483,614	501	428	1	1	0	17	19	7	1	3	54	65
Texas	384	241	21	122	1,973,914	1,231	1,226	16	3	0	80	99	48	6	7	290	351
North Central (Dist. 7-B & 9)	104	53	1	50	349,976	386	351	8	0	0	34	42	31	0	1	139	171
West (Dist. 7-C & 8)	134	109	1	24	791,636	362	349	5	0	0	16	21	8	0	0	33	41
Panhandle (Dist. 10)	16	3	13	0	59,558	48	57	0	0	0	0	0	1	0	1	4	6
Eastern (Dist. 5 & 6)	29	17	1	11	184,850	62	97	2	0	0	9	11	2	1	0	14	17
Gulf Coast (Dist. 2 & 3)	60	34	3	23	397,104	204	194	0	2	0	13	15	1	3	2	50	56
Southwest (Dist. 1 & 4)	41	25	2	14	190,790	169	178	1	1	0	8	10	5	2	3	50	60
Louisiana	54	15	16	23	334,752	185	164	6	1	0	5	6	2	2	0	20	24
Northern	36	10	13	13	152,774	107	80	0	0	0	2	2	6	0	0	12	12
Southern	18	5	3	10	181,978	79	84	6	1	0	3	4	2	2	0	8	12
Arkansas	4	2	0	2	12,904	29	38	0	0	0	1	1	1	0	0	6	7
Mississippi	8	3	0	§5	61,737	31	16	0	0	0	4	4	2	0	0	11	13
Southeastern States	0	0	0	0	0	2	6	0	0	0	0	0	0	0	0	1	1
Montana	1	0	0	1	5,068	18	14	0	0	0	1	1	1	0	0	6	7
Wyoming	12	6	0	6	68,563	53	49	0	0	0	2	2	4	0	0	6	10
Colorado-Utah	13	8	0	5	76,002	41	21	0	0	0	4	4	3	0	1	11	15
New Mexico	7	5	2	0	53,943	69	45	1	0	0	0	1	3	0	0	6	9
California	26	19	0	7	126,116	154	113	0	0	0	7	7	6	0	0	28	34
Miscellaneous (Md.)	1	0	1	0	3,972	7	2	0	0	0	0	0	0	0	1	1	2
Total United States	884	465	87	332	3,874,793	3,310	3,031	21	5	3	160	189	96	9	15	617	737
Total previous week	861	409	87	365	3,504,570			21	1	3	177	202	75	4	12	457	548
Total January 27, 1951	537	466	47	324	3,186,337			29	2	6	137	174	100	7	22	511	640

Service wells included: *2, †10, ‡3, §1.



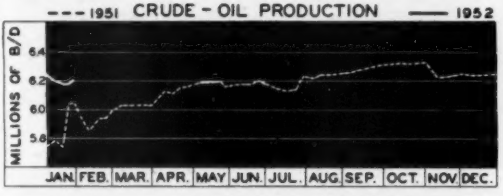


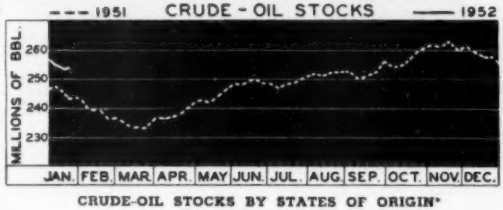
DAILY AVERAGE PRODUCTION FOR WEEK

	January 28, 1952			Jan. 19 total
	Crude oil	Lease condensate	Total	
Alabama	2,700		2,700	2,700
Arkansas	80,150	5,375	85,525	82,940
California	981,400		981,400	983,200
Colorado	82,150		82,150	78,000
Eastern	57,000		57,000	56,500
Florida	1,775		1,775	1,750
Illinois	170,800		170,800	167,200
Indiana	29,200		29,200	30,200
Kansas	323,300		323,300	317,300
Kentucky	34,100		34,100	34,000
Louisiana	616,100	39,950	656,050	656,400
North Louisiana	112,700	14,950	127,650	128,000
South Louisiana	503,400	25,000	528,400	528,400
Michigan	37,800		37,800	37,200
Mississippi	96,075	4,675	100,750	101,700
Montana	23,850		23,850	24,000
Nebraska	6,250		6,250	7,600
New Mexico	153,575	300	153,875	153,825
Oklahoma	521,900		521,900	522,300
Texas	2,703,850	45,175	2,749,025	2,749,025
Dist. 1	32,150	225	32,375	32,375
Dist. 2	155,500	3,500	159,000	159,000
Dist. 3	449,100	24,350	473,450	473,450
Dist. 4	245,125	5,145	250,270	250,270
Dist. 5	51,400	325	51,725	51,725
Dist. 6	120,100	4,000	124,100	124,100
East Texas field	268,200		268,200	268,200
Dist. 7-B	83,800	100	83,900	83,900
Dist. 7-C	123,350	6,775	130,125	130,125
Dist. 8	934,375	525	934,900	934,900
Dist. 9	157,200	230	157,430	157,430
Dist. 10	83,550		83,550	83,550
Utah	4,400		4,400	4,100
Wyoming	183,000		183,000	184,000
Total U. S.	6,109,375	95,475	6,204,850	6,193,940
Change from previous week, up			10,910	
Canada	131,644		131,644	130,934

Total U. S. production January 1-28 ..... 161,112,095 bbl.

Same period last year (crude plus co-d.) ..... 154,011,550 bbl.



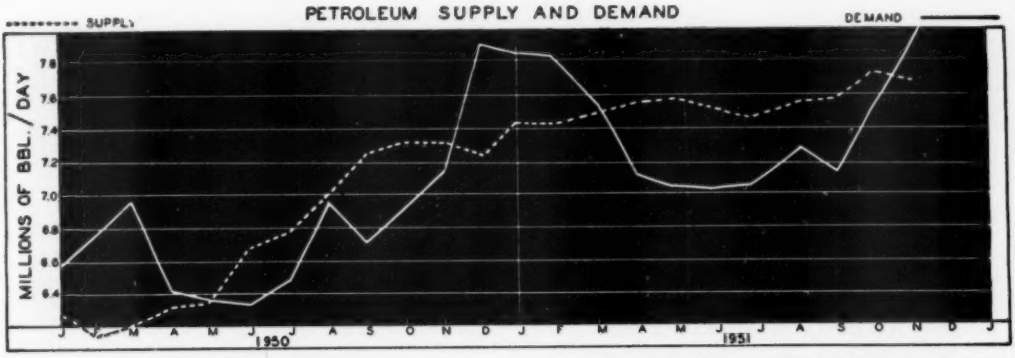


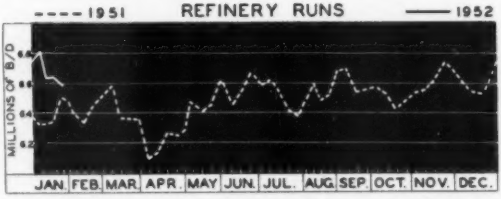
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

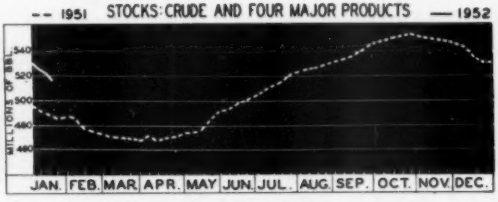
(Thousands of barrels)

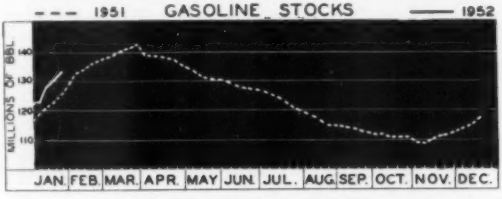
	Jan. 19, 1952	Jan. 12, 1952	Jan. 20, 1951
Pennsylvania Grade	2,104	1,900	2,079
Other Appalachian	1,755	1,719	1,145
Illinois, Indiana, Michigan	11,709	11,942	10,067
Arkansas	2,868	2,954	2,484
Louisiana	13,709	13,367	14,889
North	2,599	2,785	2,969
Gulf	11,110	10,582	11,920
Mississippi	3,369	3,402	3,632
New Mexico	7,315	7,110	6,965
Oklahoma and Kansas	39,971	40,589	38,021
Texas	121,083	121,211	114,216
East Texas Proper	10,909	11,522	(†)
West Texas	55,306	53,758	(†)
Texas Gulf	24,782	25,391	(†)
Other Texas	30,086	30,540	(†)
Rocky Mountain	14,009	13,731	12,207
California	29,865	29,170	31,249
Foreign	6,564	6,431	6,290
Total	254,324	253,616	243,244

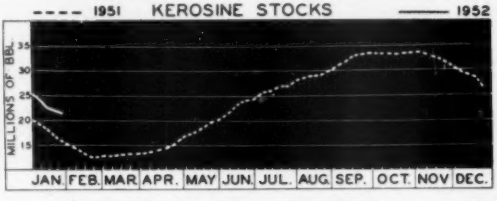
*Bureau of Mines. †Not comparable with current week.

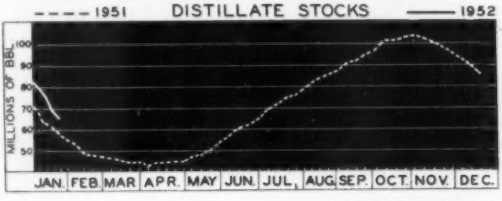


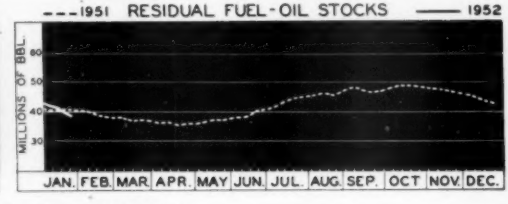










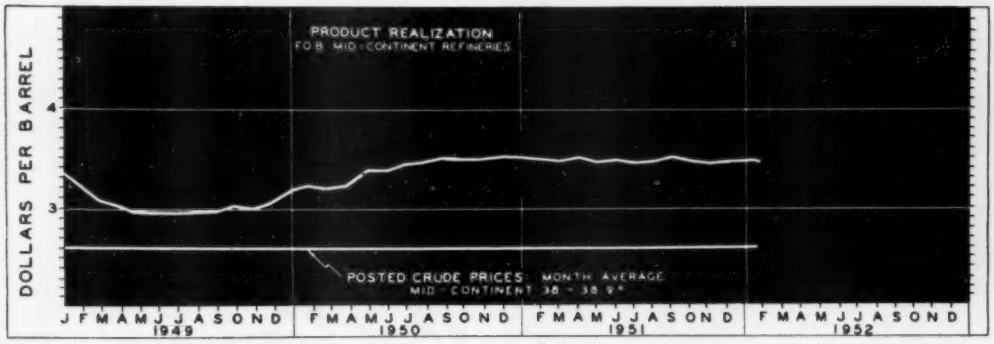


A.P.I. REFINERY REPORT, JANUARY 26

(Thousands of barrels)

District	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline†	Kerosine	Distillate	Residual	Bureau of Mines, January 1951: Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	973	386.9	48.0	256.4	244.1	24,994	7,970	20,323	9,424	1,004	392.5	41.3	278.6	253.9
Appalachian														
District 1	112	46.7	6.3	18.3	15.7	2,888	492	624	504	101	43.9	5.1	19.8	12.1
District 2	81	41.4	3.3	12.9	17.6	1,305	188	309	200	72	31.6	5.5	8.2	19.7
Ind., Ill., Ky.	1,259	645.0	81.4	246.9	192.1	30,906	4,610	13,005	5,528	1,195	606.5	82.0	232.8	193.2
Okla., Kans., Mo.	531	301.3	16.3	143.1	69.4	15,036	1,163	8,377	1,541	555	290.2	18.1	137.7	75.9
Inland Texas	239	162.1	18.7	36.3	35.7	5,076	363	1,180	1,068	225	143.6	13.7	33.3	41.7
Texas Gulf Coast	1,627	772.3	147.8	434.4	250.6	22,358	3,154	11,751	5,961	1,584	690.9	147.2	392.8	273.2
La. Gulf Coast	509	211.4	64.7	125.1	63.3	8,252	2,149	2,744	2,050	489	229.9	66.3	128.1	69.9
N. La. and Ark.	82	36.1	7.3	15.0	7.6	2,761	545	1,006	150	81	29.7	9.7	21.5	8.7
Rocky Mountain														
New Mex.co	16	9.3		2.6	3.7	147		56	31	14	8.0	.5	2.5	3.2
Other Rocky Mtn.	224	108.6	7.9	51.4	46.3	4,939	259	1,510	1,024	207	94.5	7.6	41.2	49.4
California	931	371.6	7.6	142.0	371.3	15,199	287	5,565	11,244	923	400.6	13.2	130.7	366.7
January 26, 1952	6,584	3,092.7	409.3	1,484.4	1,317.4	133,861	21,180	66,450	38,725	6,450	2,961.9	410.2	1,427.2	1,367.6
January 19, 1952	6,639	3,150.9	410.3	1,372.3	1,303.0	131,310	21,864	69,783	39,716					
January 27, 1951	6,483	3,015.1	410.4	1,422.0	1,415.0	126,261	16,446	58,997	40,378					

*At refineries including natural blended. †Finished and unfinished.



In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.47 for week ended January 19, $3.49 for previous week, and $3.52 for January 1951.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of January 30, 1952. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residua fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10-10¼	12-12.75	10¾-11
Premium gasoline, 86-88 octane	11-11⅜	13.5-13.75	11¾-12
43-44 w.w. kerosine	9-9¼	10-10.1	9
No. 2 straw fuel oil	8⅛-8⅜	9-9.25	8
No. 6 residual	$1.55-1.65	$2.45-2.60	$1.75-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La
Grade 26-70	6⅞	6⅝	6⅝
Grade 18-55	8.25	7.75	8.0

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	29-30
200 vis., No. 3 neutral, 0-10 pp.	17.5-18.5

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	32.5
180 vis., 0 p.t. neutral	31.5

WAX

Mid-Continent

132-134 A.M.P.	5.5

THE Office of Price Administration has rejected the suggested increase of about .5 cent a gallon in ceiling prices for home-heating oils on the East Coast. The suggested increase was made by Petroleum Administration for Defense following a poll of most of the major suppliers, asking if they would boost shipments of home-heating oils to the East Coast areas north of Norfolk if price ceilings were raised about .5 cent. Most of the companies agreed to this proposal even though the proposed increase would not cover higher transportation costs.

PAD has estimated that there will be a shortage of distillate on the East Coast of about 6,000,000 bbl. if weather is normal or colder than normal. This probable shortage can be charged to the lack of balance between Gulf Coast and East Coast prices.

No. 2 fuel on the Gulf Coast is firm at 8 cents a gallon and tight on the East Coast at 9 to 9.25 cents. Many of the suppliers have the lower East Coast ceiling of 9 cents. If distillate is moved in tankers at spot rates, the actual cost in New York has been estimated at 11.40 cents a gallon including 8 cents for spot purchase on the Gulf Coast, 2.85 cents for transportation, .1 cent for insurance and loss in transit, and .45 cent for storing, handling, and financing. Transportation cost is based on the current spot rate, but even at Maritime Commission base plus 25 per cent which was established for the military pool, the tanker cost would be 1.13 cents for a total New York cost of 9.68 cents compared with a ceiling of 9 cents for most suppliers.

The lack of response by Group 3 heating oils to lower temperatures in the northern demand areas is causing some concern among Mid-Continent refiners. Sharp competition has developed at pipe-line terminals where some suppliers are faced with demurrage charges. This reduces distillate tenders and prevents stock reductions in the Mid-Continent.

Soft markets in the Group 3 area have resulted in reductions for spot quotations on both kerosine and No. 2 distillate at a time when Gulf Coast and East Coast markets are very firm.

CRUDE PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.†	Okla-homa, Kansas	Gulf Coast Tex.*	West Texas†
18-18.9	$1.93			
19-19.9	1.98			
20-20.9	2.03	$2.25		$2.12
21-21.9	2.07	2.27		2.14
22-22.9	2.12	2.29		2.16
23-23.9	2.18	2.31		2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9		2.51	2.74	2.38
34-34.9		2.53	2.76	2.40
35-35.9		2.55	2.78	2.42
36-36.9		2.57	2.80	2.44
37-37.9		2.59	2.82	2.46
38-38.9		2.61	2.84	2.48
39-39.9		2.63	2.86	2.50
40 and above		2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

Kettleman Hills, California*	$2.80
Louisiana:	
Beauregard Parish	2.60
Cotton Valley (distillate)	2.85
Cotton Valley (crude)	2.70
Texas:	
East Texas	2.65
Pecos County (Yates)	2.35
Conroe	2.83
Van	2.48
Pennsylvania Grade:	
Bradford	4.25
Southwest Pennsylvania	3.82
West Virginia	3.76
Illinois Basin	2.77

*37°-37.9°.

First Aid for Cat Crackers Anywhere

IF YOUR CAT CRACKER DEVELOPS ILLS OR YOU HAVE A TECHNICAL PROBLEM ON CATALYSTS, A FILTROL ENGINEER IS READY TO SERVE YOU ON SHORT NOTICE. IN A RECENT 30-DAY PERIOD OUR ENGINEERS GAVE TECHNICAL FIELD ASSISTANCE AND PERFORMED LABORATORY EVALUATIONS FOR REFINERS OVER A WIDESPREAD AREA THAT INCLUDED EDMONTON, ALBERTA; MONTREAL, QUEBEC; TULSA, HOUSTON, PHILADELPHIA AND LOS ANGELES.

YEARS OF EXPERIENCE IN PRODUCING CRACKING CATALYSTS AND OBSERVANCE OF VARIED CRACKING OPERATIONS FORM A BACKGROUND FOR FILTROL'S TECHNICAL SERVICE AND ASSISTANCE IN THIS FIELD. WRITE FOR PARTICULARS.

OTHER
REASONS FOR USING
FILTROL CATALYSTS

1. HIGHER OCTANE BARRELS
2. HIGH BUTYLENE YIELD
3. LOW COST
4. SULPHUR RESISTANT CATALYSTS
5. FASTER REGENERATION RATE
6. VARIED PLANT FACILITIES
7. UNIFORMITY
8. LOWERED EXCESS BUTANE
9. LOW ATTRITION RATE

FILTROL CORPORATION

OFFICES: 727 WEST SEVENTH ST., LOS ANGELES 17, CALIFORNIA
PLANTS: VERNON, CALIF.; SALT LAKE CITY, UTAH; JACKSON, MISS.

Filtrol* CATALYSTS AND ADSORBENTS

*T.M. REG. U.S. PAT. OFF.

EQUIPMENT MEN . . . in the News

Lunkenheimer Announces Sales Management Changes

A general reorganization of sales territories and executive appointments, aimed at closer coordination of sales activities throughout the United States, has been announced by Harry A. Burdorf, vice president in charge of sales of The Lunkenheimer Co., Cincinnati.

M. W. PAULY

Under the new management, the United States will be divided into three Lunkenheimer sales areas—an eastern division under Melvin W. Pauly, sales manager; central division headed by Harold H. Layritz, sales manager, and western division directed by Charles W. Burrage, sales manager.

H. H. LAYRITZ

C. W. BURRAGE

R. J. Sardieck, with headquarters in Philadelphia, has been appointed district manager in the eastern division. E. R. Tieberman has been named district manager in the central division with headquarters in Dallas. C. B. Rosser, district manager, will head the western division with headquarters in Los Angeles.

Pauly joined the company in 1950 as manager of the New York branch. Layritz has been affiliated with Lunkenheimer for the past 31 years in sales and advertising capacities.

Tulsa Firm to Modernize Kansas Cracking Plant

T. M. Lumly, president of Refinery Engineering Co., has announced that his firm has completed negotiations with the El Dorado Refining Co., El Dorado, Kans., for construction work at the El Dorado plant totaling approximately 3 million dollars.

The Tulsa company has contracted to build one cat cracker, a gas-concentration plant less compressors, for complete gas recovery, and to revamp the poly plant to handle the increased charge stock made available by operation of the new cat cracker.

The new plant will be able to handle cracking stock from 10,000 bbl. of crude oil per day, and will be designed to increase operations to 15,000 bbl. daily if desired. It now handles 9,000 bbl. daily.

David Hauseman Joins Davison Chemical Corp.

Appointment of David N. Hauseman as a marketing executive of The Davison Chemical Corp. has been announced by R. L. Hockley, executive vice president. Hauseman went with Houdry Process Corp. of Philadelphia in 1948, on the retirement of the firm's founder, Eugene J. Houdry. He resigned as president of Houdry to join Davison's executive force.

D. N. HAUSEMAN

Netherlands Firm Contracts With American Cyanamid

A Netherlands chemical firm will become continental Europe's first producer of synthetic fluid cracking catalyst for the petroleum industry under terms of a contract signed recently with American Cyanamid Co. The firm, Koninklijke Zwavelzuurfabrieken (Ketjen), of Amsterdam, will manufacture Cyanamid's microspheroidal cracking catalysts, using Cyanamid's patents and processes, for sale to western European oil refiners. The catalysts are used in making high-octane fuels, raw materials for synthetic rubber, and other vital petroleum products. Production of the catalysts will begin early in 1953 and will be sufficient to handle an annual refining capacity of more than 56 million barrels of crude oil.

The catalyst to be made by the Netherlands firm will be a silica-alumina fluid cracking catalyst consisting of minute porous spheres about .002 in. in diameter.

Koninklijke Zwavelzuurfabrieken, one of the Netherlands' major sulfuric acid producers, also makes permanganates and numerous organic chemicals.

American Meter Holds Annual Sales Meeting

Donald Holtz (inset) is manager for the new American Meter Co. plant at Dallas. Other members of the company grouped in the reception room are, left to right: William B. Ashby, secretary; T. A. Bracken, Jr., treasurer; A. F. Benson, vice president of engineering; C. B. Dushane, Jr., vice president of sales; W. G. Hamilton, Jr., president; A. McBeath, controller; A. E. Weingard, vice president of production; D. C. Struble, vice president of purchasing, and D. C. Wiley, vice president of research.

The annual sales meeting of American Meter Co. was held at Dallas last month. Representatives of the sales department and key members of the company's manufacturing divisions assembled for a 3-day meeting held prior to the formal opening of the company's new Dallas plant. The operations of the company for 1951 were reviewed and plans for 1952 discussed.

The formal opening of the new plant included an open house held in the reception and display rooms. Visitors were shown a permanent ex-

hibit of American Meter's line of equipment for measurement and control of gases, oil, steam, and liquids. The new plant will produce orifice meters and related equipment. It provides complete instrument school facilities for engineers and maintenance men.

Henry to Head New Division Of Crutcher-Rolfs-Cummings

Crutcher - Rolfs-Cummings has announced that E. L. (Jack) Henry has joined the firm and will be in charge of the stationary pipe coating and wrapping division.

Henry has been active in all phases of the pipe-line industry, having worked both in a supervisory capacity and as an inspector. He spent 6 years in this work with the Barrett Division of Allied Chemical & Dye Corp. During the past year he has been chief inspector for Trunkline Gas Co.

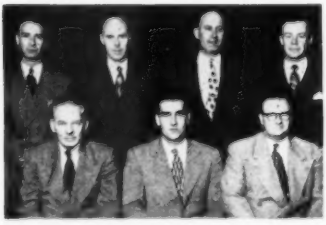
Reed Opens New Rocky Mountain Headquarters

Reed Roller Bit Co. has opened new Rocky Mountain division headquarters on East Yellowstone Highway at Casper, Wyo.

Ben Hanly, division manager, has been placed in charge of this new plant.

Core Drillers Committee Holds Meeting at Enid

The technical committee of the Diamond Core Drill Manufacturers Association held a mid-January meeting in Enid, Okla., at the plant of the George E. Failing Supply Co., manufacturers and suppliers of portable drilling equipment. The committee meeting was preliminary to the national meeting of the association which will be held in New York City this month.



Committee members present at the January meeting in Enid, Okla., were, front row: George C. Winther, R. F. Norrick, and Munsey Waters. Back row: I. F. Schenewerk, Jr., Adrian Ross, M. L. Tucker, and Raymond Jones.

Cameron Moves Into New Corpus Christi Offices

On January 12 Cameron Iron Works South Texas division offices were officially moved to the new Arnold Pipe & Supply Co. building and warehouse in Corpus Christi, Tex. Cameron salesmen shown in the new offices are, left to right: J. M. Beams, F. H. Isaacs, South Texas division manager; L. D. Perryman, Jack Ray, and Troy C. Stedman. Members of the Cameron South Texas sales staff not shown are: J. P. Wood and J. L. Headrick, stationed at Victoria, Tex., and Jerry Upchurch, McAllen, Tex.

Whessoe's Darlington Works Producing at Full Capacity

Throughout 1951 Whessoe, Ltd., works at Darlington, England, have been fully loaded with the production of equipment for the oil industry.

Manifestly for a U.K. firm to manufacture, erect, weld, and test all the major vessels associated with the first British-made catalytic cracking plant is a notable achievement. Whessoe's responsibility covered all these phases in Shell Refining & Marketing Co.'s plant at Stanlow. Foster Wheeler was the main contractor and work was completed during the year under review.

Vapordome Roof tanks and Vapor tanks made in Great Britain under license from Chicago Bridge & Iron Co. are designed to reduce losses in groups of storage tanks by interlinking them with a variable vapor space.

The export trade has not been neglected; approximately 47 per cent of the Whessoe output has gone abroad, principally to Shell's world-wide marketing installations, to Italy for Caltex, to the Far East and elsewhere for Standard-Vacuum, to the Near East for Iraq Petroleum Co., which is installing Horton floating-roof tanks for a new 30-in. pipe line. Shipments have also been made to Aruba for Standard Oil Co. of New Jersey.

There has been a steady increase in orders for tank fittings made under license from Shand & Jurs Co., of California, resulting in the formation of a special division to deal with the work.

Design, technical engineering, and experimental work continued throughout the year. As an introduction to a program of standardization, Whessoe's chief engineer, in association with a member of an oil company's engineering staff, presented a paper on "Standardization of Storage Tanks" at the Third World Petroleum Congress at The Hague last June.

The first Hortondome roof to be built in England. This evaporation-saving equipment made by Whessoe under license from Chicago Bridge & Iron Co. is at Immingham, where Whessoe built all the storage tanks for Regent Oil Co.'s new ocean installation.

(Continued on page 138)

Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY...

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UNDISPLAYED CLASSIFIED 15c a word one issue. 10% Discount three or more consecutive issues. $3.00 minimum charge. Blind Box in our care nine words. Payable in Advance.

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$12.00 a column inch one issue . . .
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Address Classified Advertising Material: The Oil and Gas Journal, P. O. Box 1260, Tulsa 1, Okla.

EQUIPMENT FOR SALE

FOR SALE: Seamless casing and tubing new and second hand. Phone Rogers Pipe and Supply Co., Tulsa, Okla.

FOR SALE: One super model Wilson single drum servicing unit, 80 hp. Waukesha 6,000′ wire, all tubing tools, mounted on GM 4-wheel drive truck. $3500. Phone Rogers Pipe and Supply Co., Tulsa, Okla.

FOR SALE: One 125 H.P. Allis-Chalmers 1170 RPM 220 Volt, 31 Amphere, Type A.R. code F. 3 phase, 60 cycle, 24 hour, 40 degree rise induction electric motor. Never used. In original crate, priced at $1500.00. Located Cushing Refinery, Cushing, Oklahoma. Contact Huitt, Deep Rock Oil Corporation, Box 1051, Tulsa, Oklahoma.

FOR SALE: Model 61 Wichita Spudder, complete with 150 H.P., LeRoi Drilling Engine, all tools, dog house, light plant, and Shear Pole Mast. Rig is mounted on 12″ I Beam Skids. Located in West Texas. Box E-559, The Oil and Gas Journal, Tulsa, Oklahoma.

USED TANKS FOR SALE

1—280,000 bbl. riveted tank, can be reset as a floating top.

1—60,000 bbl. tank, price on negotiation.

Contact

RILEY STEEL CO.
7044 Kittyhawk Ave.
Los Angeles 45, California
Phone Orchard 1-5314

Oil Country TUBULAR GOODS

Completely, equipped, well established fabricator has production time available to convert your seamless tubing and pipe by upsetting, threading and hydrostatic testing, to A.P.I. Specifications.

Plant location is on main line railroad within the Pittsburgh switching zone.

Phone or Write
McKeesport 4-9107
Box 465, McKeesport, Pa.

HEAT TREATER

8′x15′ BS&B, fully automatic with B-30 Fire Box ¼″x¼″x3/16″, insulated. Purchased new, in service 9 months $1,500 at location near McPherson, Kansas.

PUMPING UNIT

20hp. double reduction Bethlehem, beam capacity 13,000#, peak torque 97,800 inch pounds at 20spm 34″ to 54″ stroke, mounted long steel engine base $1,500 at location near McPherson, Kansas.

LEE F. CAPSHAW
452 Esperson Building Houston, Texas
CHarter 6584 KEystone 0246

EQUIPMENT FOR SALE

PIPE
All sizes; line pipe and casing, tanks, and Oilfield supplies. Edco Pipe & Supply Co., Phone 45970, P.O. Box 151, Tulsa, Oklahoma.

7500′ OF API Full Hole 4½″ Drill Pipe. Graded and tested by Sonoscope engineers. Milford Giffin, Giffin Hotel, Tel. 477, Hoisington, Kansas.

3963′ New 3½″ OD National 15.50# Grade E Range 2 Smls API External Upset Shot Peined Pipe with Hughes Internal Flush Flash Weld Tool Joints. Milford Giffin, Giffin Hotel, Tel. 477, Hoisington, Kansas.

Gaso Duplex 4½″ x 6″ Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

STEEL TANKS

Three Tanks: 25327 volume cubic feet, 180,000 gallon capacity. 35′-10″ high, 30′-0″ diameter. Weight 57,278 lbs., 5/16″ gauge, heating coils 300′-2″.

One Tank: 21,264 volume cubic feet; 170,000 gallon capacity. 30′-1″ height, diameter 30′-0″; weighs 49,675 lbs. Coils 300′-2″, 5/16″ gauge.

All in good usable condition. Priced reasonable. Phone, wire or write

SOUTHWEST STEEL CORP.
3401 Truman Rd. Kansas City, Mo.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

STAINLESS STEEL TANKS

3,000 gal. 5′x21′6″x¼″ Type 430.
2,300 gal. 5′x16′x¼″ Type 304.

TANKS

100,000 gal. 26′x24′x¼″.
15,300 gal. 9′x32′x3/16″.
8,500 gal. vert. 8′x23′x5/16″ (unused).
4,100 gal. vert. 5′x28′x¼″ (unused).
2,100 gal. 9′x3′6″x3/16″ cone bottom.
1,600 gal. 8′x7′x3/16″ cone bottom.
1,100 gal. 5′x7′8″x¼″.

TANK CAR TANKS

6,500 gal. 76″x26′7″; shell 11/16″ & 5/16″.

PRESSURE VESSELS

11,000 gal. 93″ dia. x 35′ OA, 300 PSI test.
8,200 gal., 6′x40′x2″, 390 PSI.
3,500 gal., 5′x23′x¾″, 200 PSI (4).
2,000 gal., 5′x13′7½″, 106 PSI.
1,250 gal., 4′x14′, 106 PSI.
1,200 gal., 42″x16′8″x5/16″, 125 PSI, ASME U69.
1,050 gal., 4′x12′x½″, 106 PSI.

HEAT & POWER CO., INC.
70 Pine St., Hanover 2-4890, New York 5
Machinery & Equipment Merchants

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

EQUIPMENT FOR SALE

USED rotary and cable tool drilling tools wire lines, E. A. Kelly, Box 861, Oklahoma City. Phone 5-6407.

SALES and Rental of Cable Drilling and Fishing Tools, Casing and Equipment from the Southwest's largest stock of used Cable Tools. Degen Pipe & Supply Co., Tulsa, Oklahoma.

ROTARY WORKOVER RIG

Model 658 Franks w/ rotary drive mounted 10 ton White Truck w/ Cummins Diesel engine. 87′ twin pole mast w/ racking board, five sheave crown. 5′6″ sub-structure. McKissick double sheave block, King swivel, B-J Hook. 5x10 mud pump, skid mounted, transmission drive. Complete line of tools. Rig bought new, seven months service. Working near Houston.

LEE F. CAPSHAW
452 Esperson Building Houston, Texas
CHarter 6584 KEystone 0246

Special Liquidation PRESSURE VESSELS Immediately Available

8—Used 10′ ID dia. x 40′ seam to seam x 3″ shell. Code constructed all weld. Heads 3½″. Test Pressure 900 psi. WP 600 psi.

7—Used 10′ ID dia. x 40′ seam to seam x 2½″ shell. Code constructed all weld. Heads 3″. Test Pres. 750 psi. WP 500 psi.

8—Used 8′ ID dia. x 40′ seam to seam x 2″ shell. Code constructed all weld. Heads 2¼″. Test Pressure 750 psi. WP 500 psi.

1—Used 6′ ID dia. x 40′ seam to seam x 2″ shell. Code constructed all weld. Heads 2¼″. Test Pressure 750 psi. WP 500 psi.

Good condition. Built by A. O. Smith Corporation. Located near Chicago, Illinois, and offered subject to prior SALE.

WIRE—PHONE—WRITE

Howard Kinslow

KINSLOW POWER & EQUIPMENT CO.

817 So. Boulder, Tulsa, Okla.
Phone 5-5914

EQUIPMENT FOR SALE

FOR SALE at Oklahoma City, used couplings with one dutchman, 3″ 36c, 4″ 75c, 6″ $1.00. Cities Service Oil Company, Patridge, Bartlesville, Oklahoma.

T & C Deep Well Gas Lift Pump. Capable of lifting 1250 bbls. per day from 8500 feet. Write Geo. L. Thompson, P.O. Bin J, Avenal, California.

GEO. FAILING core drill unit model 44 mounted on 1946 Ford truck with four-wheel drive, 2⅞ drill pipe, dog house on trailer, tools, light plant and water tank. Phone or write Kelly Heyen or Harry Ruyle, Dorchester, Illinois.

FOR SALE at our Sasakwa Gasolene Plant, Section 7-6N-8E, Seminole County, Oklahoma, 10 miles South of Wewoka and 1 mile East of Highway 56—4 24′ x 28′ carpenter built, modern houses, 4 room $2250.00 each plus tax. 1—3 room, $750.00 plus tax. All to be moved. Cities Service Oil Company, Patridge, Bartlesville, Oklahoma.

FOR SALE

Gas Compressor Station complete consisting of 2—Cooper Model 80 Twin 170 Hp. Gas Engine Compressors complete with building, air fin jacket water coolers, air compressor, 5′ x 15′ Inlet scrubber, other accessories and 12,000′ of 6″ and 8″ pipe. Plant operated only three months after being constructed of completely reconditioned engines and new auxiliaries. Location, Kansas.

Box E-578, The Oil and Gas Journal,
Tulsa, Oklahoma

FOR SALE
USED SEAMLESS STEEL TUBING
PLAIN AND BEVELED FOR WELDING

Ready for IMMEDIATE SHIPMENT

150,000 ft.—1½″ O.D. weighing approx. 2.14# ft.
100,000 ft.—2″ O.D. weighing approx. 2.67# ft.
125,000 ft.—2¼″ O.D. weighing approx. 3.00# ft.
50,000 ft.—3½″ O.D. weighing approx. 5.00# to 5.50# ft.
120,000 ft.—4″ O.D. weighing approx. 5.75# to 6.00# ft.
75,000 ft.—5⅝″ O.D. and 5½″ O.D. weighing approx. 10.00# ft.

(This 5⅝″ and 5½″ can be used as casing in shallow wells)

This material has never been underground, was formerly used for steam purposes, shows practically no pitting, every length will be tested for 850# hydrostatic pressure at our plant.

We carry large stocks of new and guaranteed used steel pipe and tubing up to 30″ in diameter.

We have a large quantity of welded, riveted and bolted STEEL TANKS, in both new and used, suitable for regular storage and pressure. Also Wood TANKS, formerly used for beer storage.

Your inquiries will be appreciated.

A. GREENSPON PIPE CO., INC.
(In "Our 77th Year")
50 S. Bemiston Ave. St. Louis 5, Mo.
PArkview 6885

EQUIPMENT FOR SALE

FOR SALE: U-34 Unit Rotary Rig, C-150 pump, 5½′ substructure, Lee C. Moore mast, 4200′ of 4½″ drill pipe, all complete, A-1 condition, eleven months old. H. Waggoner Drilling Company, Box 4857, Oklahoma City, Okla.

1076′ 5½″ OD 24.70# Grade E Range 2 SML Drill Pipe with 7⅝″ OD Reed Super Shrinkgrip Tool Joints. Milford Giffin, Giffin Hotel, Tel. 477, Hoisington, Kansas.

FOR SALE: Gear Reducers, two, 100 hp., new, right angle. 1300 new admiralty tubes, 1″ x 7′ long. Chemsol, Inc., 74 Dod Court, Elizabeth 3, N. J.

PUMP JACK, OWS 3500′ rating, slightly used $1150. OWS 24 swivel $300. Tables, pipe, collars, rotaries. Spudders, engines, cable tools, block, etc. Good used equipment. Complete stock of fishing tools. Pressey & Son, Pueblo, Colo.

FOR SALE: Shot Hole Rig—Franks KC 45—mounted on Tandem Chevrolet. Water truck 1951 Dodge—700 gal. Griffin tank. 200 ft. drill pipe, complete and in excellent condition. E. E. Hubbard, Phone 4926, 1206 N. 11th, Garden City, Kansas.

BETHLEHEM MC 250 drawworks, V belt compound with twin disc clutches. D-13,000 Caterpillars. Located at Duncan, Oklahoma. Keating Drilling Co., Midland, Texas, Phone 2-2473.

4″ DRILL PIPE

15,000 ft. 4½″ O.D., 16.60# Grade D Seamless, with Reed Tool Joints. App. 55% will Tubescope No. 2 and 3. Located: Oklahoma City, Okla.

MID-STATES PIPE & SUPPLY CO.
Ph. 2-9128 Tulsa, Okla.

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A completely Staffed
SERVICING COMPANY

Including: Six pulling units valued at $34,525 consisting of Wilson Junior, single drum, 40-ft. pole, driven by power-takeoff, mounted on 1948 Ford 1½ ton, will handle approx. 1500 ft. of 2″ tubing or 2700 ft. rods; Allis-Chalmers, powered with Ford V8 engine, single drum, 45 ft. pole, mounted on 1946 Ford 1½ ton, will handle approx. 3600 ft. 2½″ tubing or 5000 ft. rods; Wilson double-drum Sr. powered with Ford V8, 45-ft. pole, mounted on 1948 F7 Ford, will handle approx. 3600 ft. 2½″ tubing or 5000 ft. rods; C-60 Wichtex, double drum, powered with HP 326 Buda engine, 48-ft. double pole, mounted on 1942 GMC 2½ ton, will handle approx. 4000 ft. 2½″ tubing or 6000 ft. rods; Super Wilson, double drum, powered with MZR Waukesha, 50-ft. double pole; mounted on 1951 LF190 International tandem, will handle approx. 6500 ft. 2½″ tubing or 12,000 ft. rods; C-65 Wichtex, double-drum, with spudder attachment, powered with K-428 Buda, 52-ft. double pole, mounted on 1945 Studebaker tandem 6 x 6, will handle approx. 10,000 ft. 2″ tubing; Plus tubing and cable tools, buildings on 2-acre fenced yard, eight vehicles, shop and maintenance equipment, and truck replacement parts. Detailed descriptions available. **Box E-581, The Oil and Gas Journal, Tulsa, Okla.**

EQUIPMENT FOR SALE

6000 FT. 1″ used Jones—7 sucker rods at Oklahoma City, 30c a ft. Write M. R. Travis, Box 1343, Tulsa, Oklahoma.

FOR SALE: Westcott, Foxboro and Emco Gas Meters. Geo. R. Milner, Box 124, Okmulgee, Oklahoma.

THREE 4⅝″ x 30′ Drill collars. American overshot. One 9″ x 25′ Drill collar. One elevator for drill pipe. Kiowa Drilling Company, Inc., 717 Union National Bank Building, Wichita, Kansas.

FOR SALE: Wilson Giant Draw Works with 2—Buda JL-1335 Motors Compounded; 2—Code Butane Tanks. All complete ready to run. May be inspected while drilling 4000′ wells near Hayes, Kansas. Delivery about March first. Total price $11,000.00. Powell Drilling Company, 306 Derby Building, Wichita, Kansas.

AIR COMPRESSORS: Davey Model 160 V.D., 160 cu. ft., International Diesel powered; $2,250.00. Chicago Pneumatic, 160 cu. ft., Hercules Gasoline powered; $1250.00. Located Tulsa. Midwestern Drillers, 628 Wright Bldg., Tulsa, Oklahoma. Phone 4-5263.

FOR SALE: One 87-foot Lee C. Moore Mast, with base and starting legs; good condition. $5,000.00. Contact K & H Drilling Company, 609 Citizens Bank Building, Evansville, Indiana.

FOR SALE: Several Tanks of 2,500—5,000 and 10,000 bbl. capacities. Immediate delivery and prompt erection. Atlas Tank and Steel Co., P. O. Box 2297, phone 4-7492, Tulsa, Okla.

3—122′ American Steel derricks with safety tops, 186,000 and 325,000 lb. capacity. Located near Hobbs, New Mexico. Degen Pipe & Supply Co., Box 107, Redfork Station, Tulsa, Oklahoma.

WANT EQUIPMENT: Did you find the equipment you wish to purchase in this column? If not, use an "Equipment Wanted" classified advertisement to find it. It is available somewhere and Journal classified advertisements will find it. See box heading for classified rates, or write The Oil and Gas Journal.

EQUIPMENT WANTED

WANTED: Blower, 2000-3000 C.F.M. at 10-12# pressure. Chemsol, Inc., 74 Dod Court, Elizabeth 3, N. J.

WE BUY well drilling equipment, machines, cable tools, pipe, etc. Turn your surplus equipment into cash. Pressey & Son, Pueblo, Colorado.

WANTED: Triplex Type Pumps, minimum 900 barrels per day capacity at 1,000 PSI and 0 to 10 PSI suction and up. 1″ Regular Black Line Pipe; 1″ long collar line pipe and 1¼″ upset tubing. Must be in good condition. Lynch Oil Company, P. O. Box 414, Evansville, Indiana.

HIGHEST prices paid for Cable Tools, Machines, Equipment, Pipe and Supplies. Degen Pipe & Supply Co., Box 107, Redfork Station, Tulsa, Oklahoma.

SALES COMPANY in Western New York State established twenty years, interested in oil and gas equipment items for New York, Pennsylvania, Ohio, and West Virginia. Box E-572, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Complete Carbon Black Plant (Channel) Capacity About 20 Million Lbs./Yr. Offers With Full Details Box E-583, The Oil and Gas Journal, Tulsa, Oklahoma.

EQUIPMENT NOT IN USE: Did you find a buyer in this column for the equipment you have for sale. Someone wants it and an "Equipment For Sale" classified advertisement in the Journal will find a buyer. See box heading for classified rates or write The Oil and Gas Journal.

REAL ESTATE

SPACE IS NEEDED: A Journal display classified advertisement is the quickest way to rent or sell your real estate. In the present period of expansion oil industry firms urgently need the space you have available. If it isn't listed here, you may also find it by stating your needs in these pages. For classified rates see box heading or write The Oil and Gas Journal.

STEEL TANKS

Three Tanks: 25327 volume cubic feet, 180,000 gallon capacity. 35′-10″ high, 30′-0″ diameter. Weight 57,278 lbs., 5/16″ gauge, heating coils 300′-2″.

One Tank: 21.264 volume cubic feet; 170,000 gallon capacity. 30′-1″ height, diameter 30′-0″; weighs 49,675 lbs. Coils 300′-2″, 5/16″ gauge.

All in good usable condition.
Priced reasonable . . . Phone, wire or write

SOUTHWEST STEEL CORP.
3401 Truman Rd. Kansas City, Mo.

HELP WANTED

KEY Seismograph Personnel Needed by Established and Expanding Seismograph Company. Box E-264, The Oil and Gas Journal, Tulsa, Oklahoma.

ADMINISTRATIVE and field sales personnel. Engineering education and/or background necessary. Knowledge of petroleum and chemical industries desirable. Apply: The J. B. Beaird Company, Inc., P.O. Box 1115, Shreveport, Louisiana.

EXPERIENCED surveyors and computors for foreign service with Gravity Crews. Top salary, subsistence, and travel expense. Best working conditions. Our personnel has knowledge of this ad. Apply Box E-543, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Geologist with petroleum engineering background with several years experience for employment in Mexico. Reply giving full particulars of experience and education. Box E-564, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED Production Wellhead equipment engineer, familiar with separators, heaters, treators and controls, able to design equipment, develop and supervise installations in field. Permanent position with Tulsa area Fabricator. Our employees know of this advertisement. Reply Box E-536, The Oil and Gas Journal, Tulsa, Oklahom.a

WANTED: Chief Engineer, preferably one who has had at least six or more years in refining with some asphalt and processing engineering experience to take charge of maintenance and new construction. Location Northeast Texas. Box E-558, The Oil and Gas Journal, Tulsa, Oklahoma.

SALESMAN for independent refinery, Minneapolis territory, selling tank car and pipeline products. State fully experience, salary desired. Box E-580, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED—Drilling Superintendent for Oklahoma operations. Experienced in Emsco equipment; also knowledge of production and well completions. Call 3-2331, Oklahoma City, Oklahoma.

PETROLEUM Industry jobs, Rocky Mountain Area. Need engineers, geologists, draftsmen, field men, etc., experienced and starters. Professional Placement Service, 516 University Bldg., Denver, Colo.

OIL INDUSTRY Employment Service, 405 Tuloma Building, Tulsa, Okla. 4-5974, Tom Robinson, owner. For technical and trained oil industry personnel. No fees.

CHEMICAL SERVICE ENGINEER

Experienced in well treatment work. No sales work involved. Starting salary $400.00 per month. Box E-554, The Oil and Gas Journal, Tulsa, Oklahoma.

RESEARCH SEISMIC PARTY CHIEF

Major company desires man of exceptional training and experience in field of research seismic operations. Will be expected to operate equipment and supervise field personnel. Degree or equivalent experience essential. Excellent salary and other employee benefits for right man. Reply by letter only to:

Sinclair Research Laboratories, Inc.

Box 3157

Whittier Station, Tulsa, Oklahoma

ERECTION SUPERINTENDENTS
WELDING FOREMEN

For gas holder erection work in field. Must be willing to travel, work from blueprints and capable of testing, supervising welders, and demonstrating welding procedures. Prefer men with rigging experience. Write, giving experience, personal data, education, and salary requirement.

THE STACEY BROS. GAS CONSTRUCTION CO.
5535 Vine Street, Cincinnati 16, Ohio

HELP WANTED

DRILLERS experienced in operation of Failing, Mayhew, and similar portable equipment, for exploration work in Persian Gulf area. One year contract. Top wages. Living furnished. Give full details of experience in reply to American Independent Oil Company, 111 Sutter Street, San Francisco.

INDEPENDENT producer and drilling contractor needs petroleum engineer with production experience. Box E-549, The Oil and Gas Journal, Tulsa, Oklahoma.

THE POSITION YOU WANT: Oil industry companies are looking for men to fill every conceivable kind of position. If you didn't find the position in this column that you are looking for, use a "Situation Wanted" classified advertisement to state your qualifications. Some company is probably looking for your ability. See box heading for classified rates or write The Oil and Gas Journal.

SITUATIONS WANTED

MATURE Graduate and Registered Petroleum Engineer, familiar with drilling, production and oil field services, wants position with progressive independent. Box E-560, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 131. Ph. No. 131, Hobbs, New Mexico.

OIL micropaleontologist, degree, 10 years California experience, wants to work well samples on consulting basis. Box E-556, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER-GEOLOGIST, age 33, 4 yrs. Major Co., 2½ yrs. large Independent. Experience in Geological, Reservoir, Development Engineering, and practical production, Mid-Continent and Pacific Coast. Desires position as field production engineer, or geological engineer, with active independent. West coast or Rocky Mountain area preferred. Box E-567, The Oil and Gas Journal, Tulsa, Okla.

GEOLOGIST with eight years geological and geophysical experience wants responsible domestic or foreign position with an oil company. Age 34, masters degree. Varied experience in Mid-Continent, Permian Basin, Rocky Mountain States, Western Canada, and Williston Basin. Available April 1. Box E-573, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE Mechanical Engineer with 11 years experience in production, drilling and workover operations desires to change positions. Also 3 yrs. pipe line construction and operation in army. Now employed in South America. Box E-574, The Oil and Gas Journal, Tulsa, Okla.

REFINERY chemist 28 years old, 5 years experience plant control, research, development. Presently employed as chief chemist independent oil company. Desire change, foreign offers considered. Box E-575, The Oil and Gas Journal, Tulsa, Oklahoma.

INSTRUMENT mechanic; fourteen years experience with Major Oil Co. Cat Cracker experience. Desires permanent position in Southwest or Pacific Coast. Box E-576, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Geologist, 11 years experience subsurface, surface, seismic; 32, unmarried; desires return Rocky Mountain Region permanent basis. Box E-579, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL ENGINEER—Ph.D., 33, family. Seeks responsible position with small but well established oil company. Seven years teaching and industrial experience, including one year with major oil company. Excellent background in thermodynamics, fractionation, process design. Personable. Minimum salary $10,000. Box E-584, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL Engineer—Business Admin. Age 40. Refining processes sales and service experience. Desire position with West Coast or Gulf Coast refinery, engineering or financial organization. Box E-585, The Oil and Gas Journal, Tulsa, Okla.

SITUATIONS WANTED

EXPERIENCED PETROLEUM GEOLOGIST: Married, draft-exempt. Nine years major company experience, four years independent geological experience—Specialist in all phases subsurface and well work. Opportunity for advancement important. Location open. Box E-555, The Oil and Gas Journal, Tulsa, Okla.

GRADUATE Chemical Engineer, Age 27, with diversified Refinery experience as Plant Supt., Asst. Supt., Plant Engineer, Refinery Chemist, desires employment with independent. Box E-552, The Oil and Gas Journal, Tulsa, Okla.

GRADUATE Mechanical engineer, fourteen years experience in mechanical engineering—design and industrial construction, desires connection in South America. Box 7, Station B, Fort Smith, Arkansas.

THE RIGHT MAN: Can you fill the position you have open from the qualifications listed in this column. Men are always looking for an opportunity to improve themselves. Use a "Help Wanted" Journal classified advertisement to find the men you need. See box heading for classified rates or write The Oil and Gas Journal.

LEASE AND DRILLING BLOCKS

DRILLING Contractor has two secondary recovery leases in Eastern Kansas. Core and laboratory analysis on both showing commercial possibilities. Will sell ⅞ lease on 160A and 13/16 lease on 220A together with equipment on site to developer for $17,500.00 cash and 1/16 override. Reply Box E-582, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR LEASE: All or part of approximately 4,000 acres in Chaves County, near Roswell, New Mexico. Write Box 334, Van Wert, Ohio.

INVESTMENT funds from excess taxpayers by independent oil operator. For exploratory well drilling immediately. Geologically favorable. Illinois basin. Box E-569, The Oil and Gas Journal, Tulsa, Oklahoma.

HUGOTON Embayment and Anadarko Basin Leases & Royalties, Western Oklahoma and Southwest Kansas Areas. John P. Mathis, P. O. Box 1108, Amarillo, Texas.

LEASES ROYALTIES

Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited

B. D. BUCKLEY
6835 Delmar Ave., St. Louis 5, Mo.

NORTH DAKOTA
LEASES and MINERALS

Our latest lists with prices mailed on request. We solicit only those connected with the Oil Industry, or Royalty business. References exchanged.

JOHN ALLEN
200 Grand Pacific Hotel Phone 3850
Bismarck, North Dakota

FOR SALE
OIL PAYMENTS

$500,000.00 worth of oil payments payable out of 1/16th of 7/8ths in major oil companies undeveloped (wildcat) long-term leases in scattered West Texas Counties for

$30,000

or half of deal for

$15,000

For complete information write

Box E-577

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

LEASE AND DRILLING BLOCKS

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

OVER 2,500 acres leases, Margaret Tollett, Thomas Brooks Survey, Rains County, Texas. Important wildcat producer recently completed this county. Reasonable. Write Roy Morgan, Personal, P. O. Box 1748, Atlanta 1, Georgia.

HAVE over twenty thousand acres leases along Missouri River on North Dakota-South Dakota line. All ten year leases ten cent rentals. Interested in selling shooting option with right of selection. If interested write Box 107, El Dorado, Arkansas.

NORTHERN CALIFORNIA: Approximately 8,000 acres available for test to 2,000 feet. No bonus, 1/6 royalty, good surface geology. Gas production within 12 miles. Located Butte County, California. Principals only. Consulting Geologist, A. A. Tinsley, Marysville, California.

WANTED—Producing, non-producing leases, royalties, lands, Texas, Okla., New Mexico, Ark., La. Give price; description. American Oil Co., Box 38, Houston.

WEST—Wyoming 160 A. Royalty bargain in shallow gas field near General Pet. deep oil producer. R. O. Barnsley, 950 Lincoln, Palo Alto, Calif.

CAPITAL immediately available for geologically attractive Drilling Deals and Oil Producing Properties. Send full particulars. Box E-434, The Oil and Gas Journal, Tulsa, Oklahoma.

LOOKING FOR A LEASE? There will be over 40,000 wells drilled this year. If you are looking for a lease, drilling block or drilling deal and haven't found it in this column, or if you have a lease or drilling block you want drilled, a Journal classified advertisement can find an interested party. See box heading for classified rates, or write The Oil and Gas Journal.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908. Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing. Catalog and Samples on request. Burkhart Printing & Stationary Company, 115 South Cincinnati, Tulsa, Oklahoma.

FOR SALE—MAPS

PERMIAN BASIN DEVELOPMENT MAP of West Texas and Southeast New Mexico. Scale 1"—64,000'. Pools discovered prior to 1951 in blue, 1951 discoveries and extensions in red. Price $2.50 per copy. Midland Map Company, Box 1211, Midland, Texas.

BUSINESS OPPORTUNITIES

VALVE MANUFACTURER wanted to produce and market on royalty basis, patented fire and pressure protection valves for industrial, marine and railroad uses. Consulting services on distribuation offered. Auer Industries, Box 25, Princeton, N. J.

ORGANIZATION now serving as manufacturers representatives seeking additional quality lines for oil field and industrial trade in Oklahoma, Kansas, and Texas. P. O. Box 1201, Tulsa, Oklahoma.

WANTED: Supply and specialty lines for pipe line, drilling, production, refining, chemical plants and other industries and manufacturers in the Upper Gulf Coast, with Houston as headquarters. By qualified established company. Industrial Specialties, Inc., P. O. Box 13145, Houston 19, Texas.

SERVICES

ASSOCIATED OIL CONSULTANTS

Property Valuation Reserves Estimates
Reservoir Analysis
Production Problems

1115 Kenwood Houston 6, Texas

ROYALTIES

MONTANA ROYALTIES

Millions of acres now leased by world major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1227, Great Falls, Montana

GET TOGETHER: Both Capital and Royalties are available. If the investment proposition you want isn't listed in this column use a Journal classified advertisement to find it. See box heading for classified rates or write The Oil and Gas Journal.

INSTRUMENT SERVICE

YOUR worn instruments rebuilt for service. All types Recorders, Gauges, Electrical Instruments, Etc. Allied Instrument Service, P. O. Box 84, Tulsa, Oklahoma.

Central Area

(Continued from page 126)

being tested at Sun Oil Co. 1 Randall et al, N½ NW SW 1-20n-6w, the east 40-acre offset to the Cranberry Lake Richfield oil discovery, well was being flowed from the Dundee at a rate of from 50 to 60 bbl. of oil a day, following from between the 5-in. and 7-in. casing. Dundee was logged at 3,781 ft. and porosity and dolomite were found in cores of this section at 3,897-3,922 ft., showing possible evidence of oil saturation, but a drill-stem test run immediately after zone was cored showed only salt water. Present flowing conditions from the Dundee appear to indicate that drill-stem test failed and that original core analysis indicating that zone should produce oil, were correct.

ILLINOIS WILDCAT FAILURES

Jasper County: Sanders & Fye 1 Kocher, SW SE NW 12-6n-10e, dry, TD 2,728 ft.

Macoupin County: W. G. Grossman 1 Mueller, SW SE NE 36-7n-7w, dry, TD 610 ft.

Wayne County: A. J. Slagter, Jr., 1 Creighton, NW NW SE 35-1s-8e, dry, TD 3,365 ft.

INDIANA SUCCESSFUL WILDCAT

Greene County: F. L. Lyons 1 Enos McHenry, SE SE NE 11-8n-7w, IP 1,000,000 cu. ft. gas, Devonian 1,722-37 ft., TD 1,765 ft. (Discovery well Howesville pool).

INDIANA WILDCAT FAILURES

Greene County: H. E. Morgan 1 Ashbury, C SE NW 20-6n-4w, dry, TD 802 ft.

Sullivan County: McDonnell & Thayer 1 Wernz, NE NE SE 1-8n-11w, dry, TD 758 ft.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

Webster County: George & Wrather et al 1 Mahurin-Luck, NW SE SE 2-M-25, IP 542 bbl., McClosky 2,692-2,704 ft., TD 2,787 ft. (Extension and new pay zone Onton North pool).

WESTERN KENTUCKY WILDCAT FAILURES

Daviess County: Joe Reznick 1 Johnson, NE SE SE NE 18-P-32, dry, TD 1,208 ft.

McLean County: Stewart Coal & Oil Co. 1 Dossett minerals, NW SW SW SE 18-L-28, dry, TD 2,220 ft.

Muhlenberg County: Dr. G. E. Ellis 14 Brown heirs, W½ SE SE SE 10-H-31, dry, TD 390 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Clyde Township: P. K. Degenther 1 Trost, Sr., SE NE SW 14-2n-15w, Traverse 1,290 ft., dry, TD 1,320 ft.

Dorr Township: N. R. Dodd 1 Zerfas, SW SE SW 28-4n-12w, Traverse 1,640 ft., dry, TD 1,643 ft.

Arenac County, Standish Township: W. T. McKenna 1 Stodolak, Crandell, Gwisdala Comm., SW SW SW 1-18n-4e, Dundee 2,721 ft., dry, TD 2,948 ft.

Missauke County, Aetna Township: W. R. Swetland 1 Merrill Palmer School, SE NE SE 22-22n-6w, Dundee 3,973 ft., dry, TD 3,980 ft.

Montcalm County, Pine Township: Michigan Oil Co. 1 Towle Est., SE SE SE 17-11n-8w, Dundee 3,302 ft., dry, TD 3,419 ft.

Oceana County, Benona Township: Gulf Refining Co. 1 Burmeister, SE NE SE 16-14n-18w, Traverse 1,7111 ft., dry, TD 1,745 ft.

Van Buren County, Bangor Township: Norman L. Stevens 1 Borglin, SE SE SE 2-2s-16w, Traverse 1,061 ft., dry, TD 1,064 ft.

EQUIPMENT MEN

(Continued from page 134)

American Iron Elects Rubac Executive Vice President

ELMER E. RUBAC

Elmer E. Rubac was elected executive vice president and assistant general manager of American Iron & Machine Works Co. at the annual December meeting of the board of directors held at the Oklahoma City office.

Rubac has been with American Iron since 1937, with the exception of 3 years when he was on military leave of absence. For the past 2 years he has held office as vice president of the company.

Others elected as officers and members of the board of directors are: J. A. Gray, chairman of the board; M. G. McCool, president and general manager; Cecil N. Cook, vice president; V. L. Thomas, secretary-treasurer, and A. J. Farfel, assistant secretary.

Richards Is Elected President of OPW Corp.

G. B. RICHARDS

G. B. Richards has been elected president of OPW Corp., Cincinnati, manufacturers of valves, fittings, and assemblies for handling hazardous liquids. The announcement was made by George L. Ohrstrom, chairman of the board.

Previous to his association with OPW Corp. as executive vice president in 1949, Richards was general sales manager of Firth Carbide & Steel Co. of Pittsburgh, and of Bostitch Co. He also served as a sales executive with Imperial Belting Co., of Chicago, and with Firestone Tire & Rubber Co.

Permian Basin

(Continued from page 125)

A Childress County wildcat, Blanco Oil and Al Buchanan 1 Russell, has been abandoned at total depth of 6,502 ft., after drillstem tests found no indication of production. A slight gas show was logged from 2,782-86 ft., and a slight show of oil and gas from 6,451-66 ft.

SOUTHEASTERN NEW MEXICO

Humble Oil & Refining Co. 1 Federal-Elliott, 1-16s-34e, wildcat 8 miles southeast of the Saunders Devonian field in Lea County, has recovered additional distillate on drill-stem tests.

A test in the Permo-Pennsylvanian from 12,690-12,927 ft. developed gas and distillate and at 12,895-12,927 ft. it had a flow of 36 bbl. of 57°-gravity oil in 1½ hours.

Last test reported, identified as Devonian, from 13,121-78 ft., had gas in 13 minutes, water blanket in 14 and distillate at the end of 30 minutes. Gas volume was not estimated but distillate yield was 3 bbl. an hour. Operators were coring ahead.

On the east side of the North Brunson Ellenburger discovery of southeast Lea County, Gulf Oil Corp. 8-E Leonard, 2-21s-37e, found the Ellenburger high at 7,755 ft., and minus 4,268 ft. Field reports placed the formation 530 ft. high to the 6-E Leonard, north offset to the discovery.

SOUTHEAST NEW MEXICO WILDCAT SUCCESS

Lea County: Amerada Petroleum Corp. 1 Fred Turner, 17-20s-38e, TD 9,429 ft., elev. 3,566 ft., pay 9,012 ft., IP 827 bbl. 45°-gravity oil, 20/64-in. choke, TP 450 psi., GOR 528 cu. ft.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that the lands listed herein are offered through sealed bids on the terms hereinafter specified, to qualified bidders of the highest cash amounts per acre, as a bonus for the privilege of leasing the lands under sec. 17 of the Leasing Act of February 25, 1920 (41 Stat. 437; 30 U.S.C. sec. 181), as amended. All bids must be submitted to the Director, Bureau of Land Management, Washington 25, D. C., on or before 1 p. m. of the date set out herein. Each bidder must submit with the bid one-fifth of the amount bid in cash or by certified check on a solvent bank or by money order made payable to the order of the Treasurer of the United States, and file a showing of citizenship and interests similar to that required under 43 CFR 192.42(e) (4) and (f) Circular 1782. The envelopes should be plainly marked that they are not to be opened before the date and hour set out herein, and should show the number of the parcel and the name of the field. No bids received after the hour fixed herein for receiving bids will be considered. The remainder of the bonus and the annual rental must be paid and an acceptable surety bond in the sum of at least double the amount of rental, but in no case less than $1,000 nor more than $5,000, must be furnished by a successful bidder prior to the issuance of a lease. An acceptable $5,000 surety bond will be required prior to commencing drilling operations on the land. The deposits of the other bidders will be returned upon acceptance of the successful bids. Bidders are warned against violation of section 1860, Title 18, U. S. Code, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Royalties payable to the United States will be at the rate of 12½ per cent to 25 per cent for oil, and 12½ per cent to 16⅔ per cent for gas, in accordance with Schedule B in the lease form. Annual rental will be at the rate of $1 per acre. The lands are in the known geologic structure of the Fenton field, New Mexico, and are offered in one parcel described as follows: T. 21 S., R. 28 E., N.M.-P.M., sec. 15, S½NW¼, N½SW¼, 160 acres. Bids must be submitted on or before 1 p.m., E.S.T., March 19, 1952. With reference to the bond requirement, if the successful bidder has an approved full nation-wide bond in the amount of $150,000, or an approved nation-wide bond covering public domain lands for the State of New Mexico, no additional bond will be required. Marion Clawson, Director.

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Web Wilson Oil Tools	115
Western Supply Company	88
Westinghouse Electric Corp.	106, 107
Willson Products, Inc.	28
Wood's Sons Co., T. B.	100
Wright Chemical Corporation	82
Youngstown Sheet and Tube Company	49
Yarnall-Waring Co.	113

LEGAL

SEALED bids will be received at the office of the Area Director, Bureau of Indian Affairs, Room 305, Federal Building, Albuquerque, New Mexico, until 2:00 o'Clock P.M., MST, February 12, 1952, and then publicly opened for sale of oil and gas leases on 55 tracts of Jicarilla Tribal Indian land located in the Rio Arriba and Sandoval Counties of New Mexico on the Jicarilla Indian Reservation, totalling approximately 136,984.07 acres. Each tract, containing approximately 1920 to 2500 acres, is offered for lease separately. For complete description of the land, location, provisions and stipulations of the leases to be sold, address the Superintendent Jicarilla Indian Agency, Dulce, New Mexico. Guy Hobgood, Superintendent.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that the lands listed herein are offered through sealed bids on the terms hereinafter specified, to qualified bidders of the highest cash amounts per acre, as a bonus for the privilege of leasing the lands under sec. 17 of the Leasing Act of February 25, 1920 (41 Stat. 437; 30 U.S.C. sec. 181), as amended. All bids must be submitted to the Director, Bureau of Land Management, Washington 25, D. C., on or before 1 p. m. of the date set out herein. Each bidder must submit with the bid one-fifth of the amount bid in cash or by certified check on a solvent bank or by money order made payable to the order of the Treasurer of the United States, and file a showing of citizenship and interests similar to that required under 43 CFR 192.42(e) (4) and (f) Circular 1782. The envelopes should be plainly marked that they are not to be opened before the date and hour set out herein, and should show the number of the parcel and the name of the field. No bids received after the hour fixed herein for receiving bids will be considered. The remainder of the bonus and the annual rental must be paid and an acceptable surety bond in the sum of at least double the amount of rental, but in no case less than $1,000 nor more than $5,000, must be furnished by a successful bidder prior to the issuance of a lease. An acceptable $5,000 surety bond will be required prior to commencing drilling operations on the land. The deposits of the other bidders will be returned upon acceptance of the successful bids. Bidders are warned against violation of section 1860, Title 18, U.S. Code, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Royalties payable to the United States will be at the rate of 12½ per cent to 25 per cent for oil, and 12½ per cent to 16⅔ per cent for gas, in accordance with Schedule B in the lease form. Annual rental will be at the rate of $1.00 per acre. The lands are in the known geologic structure of the Monument-Jal field, N.M.P.M., New Mexico, and are offerred in the following parcels: Parcel No. 1: T. 23 S., R. 36 E., Sec. 20, SW¼, 160 acres. Parcel No. 2: T. 20 S., R. 36 E., Sec. 35, NW¼, 160 acres. Parcel No. 3: T. 23 S., R. 36 E., Sec. 17, SW¼, 160 acres. Parcel No. 4: T. 24 S., R. 36 E., Sec. 27, SE¼SW¼, SW¼SE¼, 80 acres. Total 560 acres. Bids must be submitted on or before 1 p. m., E.S.T., March 19, 1952, and must be submitted on each parcel separately, but no objection will be made to the award of more than one parcel to the same successful bidder. With reference to the bond requirement, if the successful bidder has an approved full nation-wide bond in the amount of $150,000, or an approved nation-wide bond covering public domain lands for the State of New Mexico, no additional bond will be required. Marion Clawson, Director.

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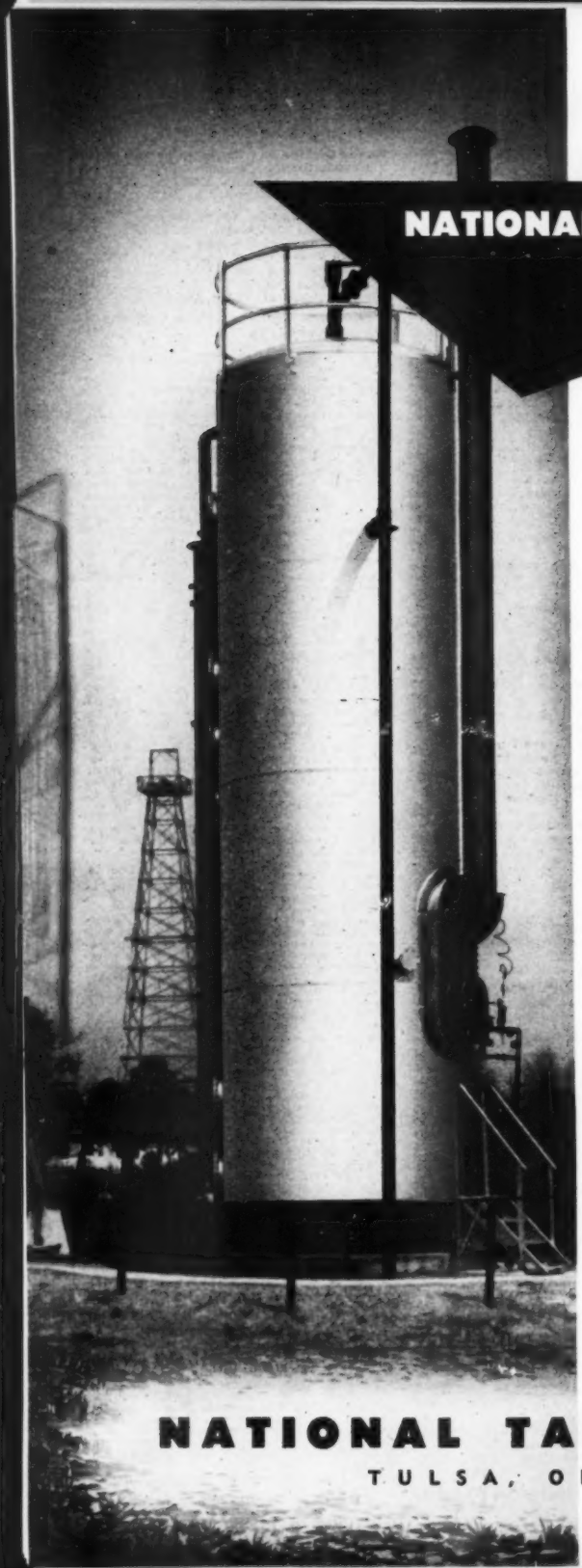


NATIONAL ICP TREATER . . .

SAVES
$731.64 PER MONTH

Inter-Office Correspondence

To: [redacted] Date: April [redacted]

Subject: National ICP Treater
installed on our [redacted] Lease.

Dear Bud:

We thought you might be interested to know of the results obtained from the installation of the ICP Treater on our [redacted] Lease last September.

In figuring the amount of gas purchased for this lease, taking months comparable in weather conditions, six months before and six months after the installation, we find that in the preceding six months we bought gas in the amount of $1,298.99 and in the succeeding six months we purchased gas in the amount of $599.47 a total saving for six months of approximately $699.47 or $133.00 per month.

Before installing this Treater it was necessary that we clean ten tanks per month, losing approximately twenty barrels of oil each time. This would amount to 200 barrels per month or approximately $486.00 per month. This Treater has now been in service approximately eight months and we have not cleaned a single tank.

In addition to the gas and tank cleaning saving we also raised the gravity of the oil an average of 1°, which raised the price of the oil .02¢ per barrel. As this lease averaged 5,632 barrels of oil per month after installation of the Treater the amount gained on raising the gravity amounted to $112.64 per month.

We figure the total savings as follows:

$133.00 per month saving on gas.
$486.00 worth of oil saved each month.
$112.64 more per month for increased gravity.
$731.64 Total saving each month.

The first six months after installing this Treater we had saved $4,395.84. As the Treater cost $3,439.26, at the expiration of six months the Treater was paid for with $956.58 left over as profit.

Respectfully yours,

[redacted]

It's a National

NATIONAL TANK COMPANY

TULSA, OKLAHOMA

Hazard LAY-SET PREFORMED —a distinctive BRAND

Recent excavations in Egypt revealed bricks bearing names believed to be those of the makers. Stones in the walls of Pompeii bore the proud marks of Italian stone cutters. During the Middle Ages the workman placed a distinctive mark on his artistic creations. Thus grew the practice of branding merchandise. Making wire rope which can bear the proud LAY-SET trade mark is traditional with HAZARD. Since the day in 1846 when Erskine Hazard built the first machine which laid a group of wires around a core to make a better wire rope, the HAZARD brand on a reel has been evidence of highest quality. It is your assurance that the wire rope will perform to your satisfaction.

See your local HAZARD distributor

ACCO *In Business for Your Safety*

ALSO MAKERS OF THE COMPLETE LINE OF Registered WIRE ROPE SLINGS

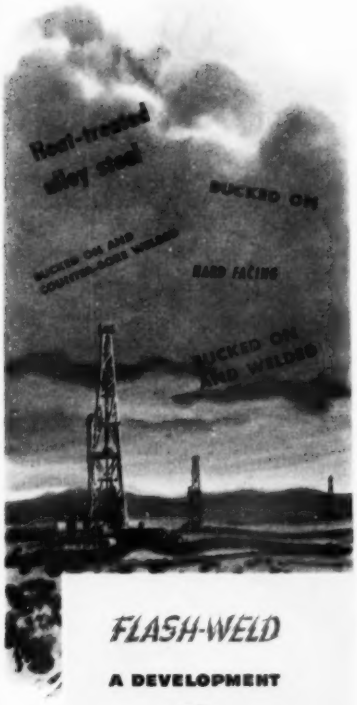
AMERICAN CHAIN & CABLE

HAZARD WIRE ROPE DIVISION

TRADE MARK

Wilkes-Barre, Pa. · Chicago · Denver · Houston · Los Angeles · New York · Odessa, Tex. · Philadelphia · Pittsburgh · San Francisco · Bridgeport, Conn.

Where Do Tool Joint Developments Come From?



Check the records and you'll find that the men who develop rock bits also are responsible for virtually every major improvement in tool joint design.

It's easy to understand why!

Every factor determining the speed and economy of making hole is a concern of Hughes rock bit engineers and field men.

Here's the record of Hughes' developments:

1. First fully heat-treated alloy steel tool joint ...making use of tool joints economically feasible.
2. First tool joint bucked on with controlled torque to prevent galling of pipe threads and washouts.
3. First bucked on and welded tool joint to prevent last engaged thread failures.
4. First bucked on and counter-bore welded tool joint to reduce installation costs.
5. First unitized drill stem—the welding of tool joints and pipe by the Hughes FLASH-WELD process.
6. First hard facing in depth to lengthen life of tool joints.

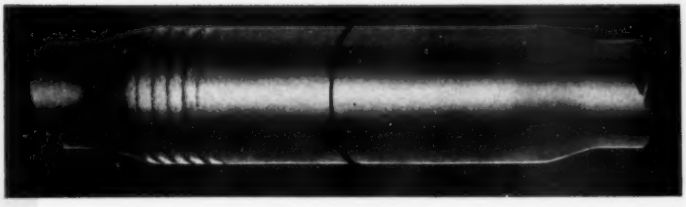
Each Hughes tool joint development can be traced directly to intimate day-to-day contact with the problem of keeping drilling speeds up and costs down.

FLASH-WELD

A DEVELOPMENT

OF

HUGHES

TOOL COMPANY

HOUSTON, TEXAS